RAILROAD GAZETTE

FRIDAY, APRIL 10, 1896.

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Contributions.

The Use of Lubricants on Curves.

Richmond, Fredericksburg & Potomac Railroad Co.,
RICHMOND, Va., April 4, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have just read your note upon lubricating rails on curves (page 233). The obvious advantage of diminishing flange friction by an unguent was recognized 40 years ago by those who managed a temporary track crossing the Blue Ridge mountains in Virginia, with four and five per cent. gradients and curves less than 300 ft. radius. The trains were drawn by special engines then considered enormously heavy, and a bit of sponge at the end of a spring was so arranged as to lubricate the corner made by the tread and the flange. The line was several miles in length and curved nearly its entire length.

E. T. D. MYERS, *President.*

Mr. Vaughan on Rating Locomotives.

PHILADELPHIA, April 3, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

While I am glad that Mr. Vaughan in his paper on the "Hauling Capacity of Locomotives" has drawn attention to the fact that an intelligent use of the momentum of the train can be made to increase the train-load, I would deprecate any arbitrary limiting of the height of the grade to be overcome by this means. In the discussion of his paper, the limits were put much higher than he had, but it seems to me that each case should be studied by itself. For instance, a one per cent. grade 25,000 ft. long, and therefore 250 ft. high, can be virtually reduced to a 0.94 per cent. grade by only using the low speed of 20 miles per hour, on which an engine with 100,000 lbs., on the drivers could haul one more car than it could without the aid of momentum.

It seems to me that the allowance made for empty cars is entirely too high, and is defective in not stating the grade on which it was based. Such an allowance on a 0.5 per cent. grade would indicate that the extra resistance of empty cars was 8½ lbs. per ton, while on a 2 per cent. grade would make it 23½ lbs. per ton. As the most careful experiments made only show the extra resistance to be from two to four pounds per ton, the allowance is certainly more than ample.

JOHN MARSTON, JR., C. E.

Belpaire Fireboxes in England.

Manchester, Sheffield & Lincolnshire Railway
Locomotive Engineer's Office.
GORTON, March 18, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I was much interested in perusing an article on "Recent Improvements in the Construction and Design of Locomotives," which appeared in your issue of Feb. 7, and as this railway company is the only one in this country that has had any experience of Belpaire fireboxes, I should like the author of the article to know what my experience is of them as I cannot quite agree with him.

In his remarks he states that greater weight is required for the same power than with other screw-stay boilers. This may be so but our experience of radial, screw-stay boilers is anything but satisfactory, and not, as stated in your article, giving satisfaction in security and durability. I am not of opinion that Belpaire fireboxes cost considerably more for the same power than the radial stay type. It may be so in first cost, but certainly not in maintenance. The Belpaire box as against our old standard semi-circular firebox, with roof stay-bars weighs, at least, all told, 2 cwts less, besides having other advantages one of which is that we obtain a far greater steam space with greater security.

Although the first Belpaire firebox built here in 1891, and running ever since, has completed over 150,000 miles, and that on goods trains there is no trace of any difficulty in tube holes, or any other portion of the firebox, and so far as I know there is neither a better nor cheaper (in the long run) than the Belpaire form, and I have therefore decided to adopt it as our standard type for the future.

I inclose you sketch of our Belpaire type of firebox. I might add that the working pressure of the Belpaire is 180 lbs. per square inch, and I have never experienced any trouble at the point where the cylindrical shell joins the rectangular firebox.

HARRY POLLITT.

Supreme Court Decision in Social Circle Case.

The decision of the United States Supreme Court on March 30 in the Social Circle case, so called, was delivered by Mr. Justice Shiras. The substance of the decision was quite fully given in the note published by us last week, page 234, but we add a few notes from the full text of the opinion, as a matter of record.

The original complaint was by the James & Mayer Buggy Co., of Cincinnati, on Oct. 18, 1889. Their goods were carried southward to Atlanta, 474 miles, for $1.07 per 100 lbs.; to Augusta through Atlanta, 645 miles, at the same rate; but to Social Circle, 119 miles short of Augusta, the rate was $1.37. The opinion of the Interstate Commerce Commission dealt with competing rates on similar goods, from New York and other eastern cities which, passed westward over the same railroad which took Cincinnati buggies eastward, but the appeal had to do only with the rates from Cincinnati. The Georgia Railroad claimed the right to charge the local rate from Atlanta to Social Circle. It had refused to participate in a through rate from Cincinnati to that point and the Cincinnati, New Orleans & Texas Pacific issued through bills of lading without authority from the Georgia road, simply adding the local rate of the latter to the rate to Atlanta. The United States Circuit Court in Georgia refused to enforce the order of the Interstate Commerce Commission directing the roads to cease this violation of the long and short haul clause of the law, but the Circuit Court of Appeals for the fifth district reversed the decree of the Circuit Court, deciding in favor of the Interstate Commerce Commission. This latter opinion is now sustained.

The plea of the Georgia Railroad was based on the claim that its line lay wholly within one state, and that therefore it was not subject to the control of the Interstate Commerce Commission. On this point the Supreme Court says:

It may be true that the "Georgia Railroad Company," as a corporation of the State of Georgia, and whose entire road is within that state, may not be legally compelled to submit itself to the provisions of the act of Congress, even when carrying between points in Georgia freight that has been brought from another state. It may be that if, in the present case, the goods of the James and Mayer Buggy Company had reached Atlanta, and there and then, for the first time, and independently of any existing arrangement with the railroad companies that had transported them thither, the Georgia Railroad Company was asked to transport them, whether to Augusta or to Social Circle, that company could undertake such transportation free from the control of any supervision except that of the State of Georgia. But when the Georgia Railroad Company enters into the carriage of foreign freight, by agreeing to receive the goods by virtue of foreign through bills of lading and to participate in through rates and charges, it thereby becomes part of a continuous line, not made by a consolidation with the foreign companies, but made by an arrangement for the continuous carriage or shipment from one state to another, and thus becomes amenable to the Federal act in respect to such interstate commerce. We do not perceive that the Georgia Railroad Company escaped from the supervision of the Commission by requesting the foreign companies not to name or fix any rates for that part of the transportation which took place in the State of Georgia when the goods were shipped to local points on its road. It still left its arrangement to stand with respect to its terminus at Augusta and to other designated points. Having elected to enter into the carriage of interstate freights and thus subjected itself to the control of the Commission, it would not be competent for the company to limit that control, in respect to foreign traffic, to certain points on its road and exclude other points.

At this point the decision of Judge Brewer in the case of C. & N. W. vs. Osborne (52 Fed. Rep. 912) comes in, and Judge Shiras points out that it is not necessary to differ with the opinion in that case in order to settle this one. (The construction placed by Judge Brewer in the C. & N. W. case, on the term "line," is not overruled, except by implication.)

The railroads argued that the Commission did not give sufficient weight to the alleged dissimilarity of circumstances in the shipment of goods to Social Circle, but Judge Shiras holds that to be a question of fact, and as the Circuit Court of Appeals has accepted the Commission's finding, that conclusion will be accepted. There is nothing in the record to warrant a different conclusion.

Thus far this opinion deals with the appeal of the Interstate Commerce Commission. The railroads appealed from the decision of the Commission reducing the rate from Cincinnati to Atlanta from $1.07 to $1. It appears that the Commission made this order because the rate to Birmingham, about the same distance, was only 89 cents. The railroads, however, replied that the Atlanta rate, $1.07, had been fixed by active competition and was reasonably low, and that the Birmingham rate had been forced down by the action of the Kansas City, Memphis & Birmingham road in making a 75-cent rate from Memphis. In view of these facts the Supreme Court, holding that the Commission has no power to fix rates, decides that "the reasonableness of the rate, in a given case, depends on the facts, and the function of the Commission is to consider these facts and give them their proper weight. If the Commission, instead of withholding judgment in such a matter until an issue shall be made and the facts found, itself fixes a rate, that rate is prejudged by the Commission to be reasonable."

Judge Shiras in this decision gives an implied approval of a bill now before Congress designed to strengthen the power of the Interstate Commerce Commission. He says:

"We think this a proper occasion to express disapproval of such a method of procedure on the part of the railroad companies as should lead them to withhold the larger part of their evidence from the Commission, and first adduce it in the Circuit Court. The Commission is an administrative board, and the courts are only to be resorted to when the Commission prefers to enforce the provisions of the statute by a direct proceeding in the court, or when the orders of the Commission have been disregarded. The theory of the act evidently is, as shown by the provision that the findings of the Commission shall be regarded as *prima facie* evidence, that the facts of the case are to be disclosed before the Commission. We do not mean, of course, that either party, in a trial in the court, is to be restricted to the evidence that was before the Commission, but that the purposes of the act call for a full inquiry by the Commission into all the circumstances and conditions pertinent to the questions involved."

Supreme Court Decision in Texas & Pacific Case.

This decision, briefly reported in our columns last week, was also delivered by Mr. Justice Shiras. The complaint was first made by the Interstate Commerce Commission, which had made an order, on its own motion, directing the defendant and many other roads to charge substantially the same rates upon import freight as on that which originated in this country. Subsequently, the New York Board of Trade & Transportation complained to the Commission that certain roads disregarded the order, and the Commission, after a hearing, held that the Texas & Pacific was not justified in accepting less from New Orleans on Liverpool shipments than upon shipments from New York, all going to San Francisco. The road disobeyed the order and the Commission complained to the Circuit Court at New York. This court sustained the Commission and, on appeal, the Circuit Court of Appeals affirmed the decision of the lower court. Both judgments are now reversed.

Judge Shiras first decides that the Texes & Pacific is wrong in claiming that the Interstate Commerce Commission has no standing in court. "The language of the statute, in creating the Commission, and in providing that it shall be lawful for the Commission to apply by petition to the Circuit Court sitting in equity, sufficiently implies the intention of Congress to create a body corporate with legal capacity to be a party plaintiff or defendant in the Federal Courts."

The road asserted that its revenue on the Liverpool traffic was considerable; that the rates charged are no disadvantage to New Orleans; that San Francisco consignees buy at first hands in Liverpool; that the order would also injure the road's traffic to Memphis, St. Louis and other places; that the competition to San Francisco is almost wholly by British ships, and that the practice of the railroad is a valuable convenience to merchants. "The through bill of lading furnishes a collateral for the transaction of business; takes from the shipper and consignee both the care as to intermediate charges, elevators, wharves and cost of handling, and puts it on the carrier; it reduces the intermediate charges, very much facilitates the transaction of business, and helps to swell its volume; that the tendency of the through bill of lading is to eliminate the obstacles between the producer and consumer, and it has done much in that direction. These and other uncontroverted facts that appear in this record would seem to constitute 'circumstances and conditions' worthy of consideration, when carriers are charged with being guilty of unjust discrimination or of giving unreasonable and undue preference or advantage to any person or locality."

The view of the Commission that it could not rightfully consider such facts is strained and untenable. The Interstate Commerce law was passed because railroads made secret discriminations and by pools and other combinations oppressed entire communities, and its purpose was to regulate commerce, in its widest sense. This scheme of regulation cannot be presumed to be restricted to a partial treatment of the subject. It could not be readily supposed that Congress intended, when regulating such commerce, to interfere with and interrupt, much less destroy, sources of trade and commerce already existing, nor to overlook the property rights of those who had invested money in the railroads of the country, nor to disregard the interests of the consumers, to furnish whom with merchandise is one of the principal objects of all systems of transportation.

The language of the statute confirms the Court's view, including as it does practically all manner of transportation except that wholly within a state. Judge Shiras goes on to expound the language of the second, third and fourth sections, but he thinks the powers of the Commission "are not very clearly defined in the act." The twelfth section, however, gives the Commission all necessary and very full powers.

There is no complaint of any specific damage to anyone in this case, and this fact was emphasized in the argument of the defense; but the decision holds that the complaint by the New York Board of Trade and Transportation was valid. It says, however:

"We do not wish to be understood as implying that it would be competent for the Commission, without a complaint made before it, and without a hearing, to subject common carriers to penalties. It is also obvious that if the Commission does have the power, of its own motion, to promulgate general decrees or orders which thereby become rules of action to common carriers, such exercise of power must be confined to the obvious purposes and directions of the statute. Congress has not seen fit to grant legislative powers to the Commission."

Coming now to the case in hand, besides the facts already stated, it is to be noted that the Commission did not find the local rates of the road unreasonable, nor that any cause for complaint existed at New Orleans or San Francisco. It justified its action wholly upon its own dictum that lower rates for imported goods worked unjust discrimination. But the language of the act does not justify the Commission in this view.

"It must take into consideration: The welfare and advantage of the common carrier, and of the great body of the citizens of the United States who constitute the consumers and recipients of the merchandise carried; and the attention of the Commission is not to be confined to the advantage of shippers and merchants who deal at or near the ports of the United States, in articles of domestic production. Undoubtedly the latter are likewise entitled to be considered; but we cannot concede that the Commission is shut up by the terms of this act to solely regard the complaints of one class of the community. We think that Congress has here pointed out that, in considering questions of this sort, the Commission is not only to consider the wishes and interests of the shippers and merchants of large cities, but to consider also the desire and advantage of the carriers in securing special forms of traffic, and the interest of the public that the carriers should secure that traffic, rather than abandon it or not attempt to secure it. It is self-evident that many cases may and do arise where, although the object of the carriers is to secure the traffic for their own purposes and upon their own lines, yet, nevertheless, the very fact that they seek, by the charges they make, to secure it, operates in the interests of the public.

"Moreover, it must not be overlooked that this legislation is experimental. Even in construing the terms of a statute, courts must take notice of the history of legislation, and, out of different possible constructions, select and apply the one that best comports with the genius of our institutions and, therefore, most likely to have been the construction intended by the law-making power. Commerce, in its largest sense, must be deemed to be one of the most important subjects of legislation, and an intention to promote and facilitate it, and not to hamper or destroy it, is naturally to be attributed to Congress. The very terms of the statute, that charges must be *reasonable*, that discrimination must not be *unjust*, etc., necessarily imply that strict uniformity is not to be enforced. Congress must have intended that whatever would be regarded by common carriers, as matters which warranted differences in charges, ought to be considered in forming a judgment whether such differences were or were not unjust. Some charges might be unjust to shippers—others might be unjust to the carriers. The rights and interests of both must, under the terms of the act, be regarded by the Commission."

The law does not say what is reasonable and what is unreasonable preference, and, this being a question of fact, it must be decided by the Commission; and of course the Commission must examine all facts and matters which a carrier would consider. The only argument which seems to sustain the Commission is that the carrier is required to publish its rates, but it does not appear that the Commission may not compel all common carriers within the reach of their jurisdiction to publish such [import] rates and to furnish the Commission with all statements or reports prescribed by the statute. Nor was there any allegation or finding that the Texas & Pacific had failed to file with the Commission copies of its joint tariffs showing rates from English ports to San Francisco.

The opinion of the Commission thatit ought to construe the Interstate Commerce law to make it co-operate with the assumed policy of the tariff laws is rejected. The effort of the Commission, by a rigid general order, to deprive the inland consumers of the advantage of through rates, and to thus give an advantage to the traders and manufacturers of the large seaboard cities, seems to create the very mischief which it was one of the objects of the act to remedy.

Judge Shiras next quotes English decisions on cases similar to this, to the extent of six pages, and then cites two or three previous decisions of the United States Supreme Court, among which is that of Judge Jackson in the party-rate case, in which it was said:

"Subject to the two leading prohibitions that their charges shall not be unjust or unreasonable, and that they shall not unjustly discriminate, so as to give undue preference or advantage, or subject to undue prejudice or disadvantage persons or traffic similarly circumstanced, the act to regulate commerce leaves common carriers as they were at the common law, free to make special contracts looking to the increase of their business, to classify their traffic, to adjust and apportion their rates so as to meet the necessities of commerce and generally to manage their important interests upon the same principles which are regarded as sound, and adopted in other trades and pursuits."

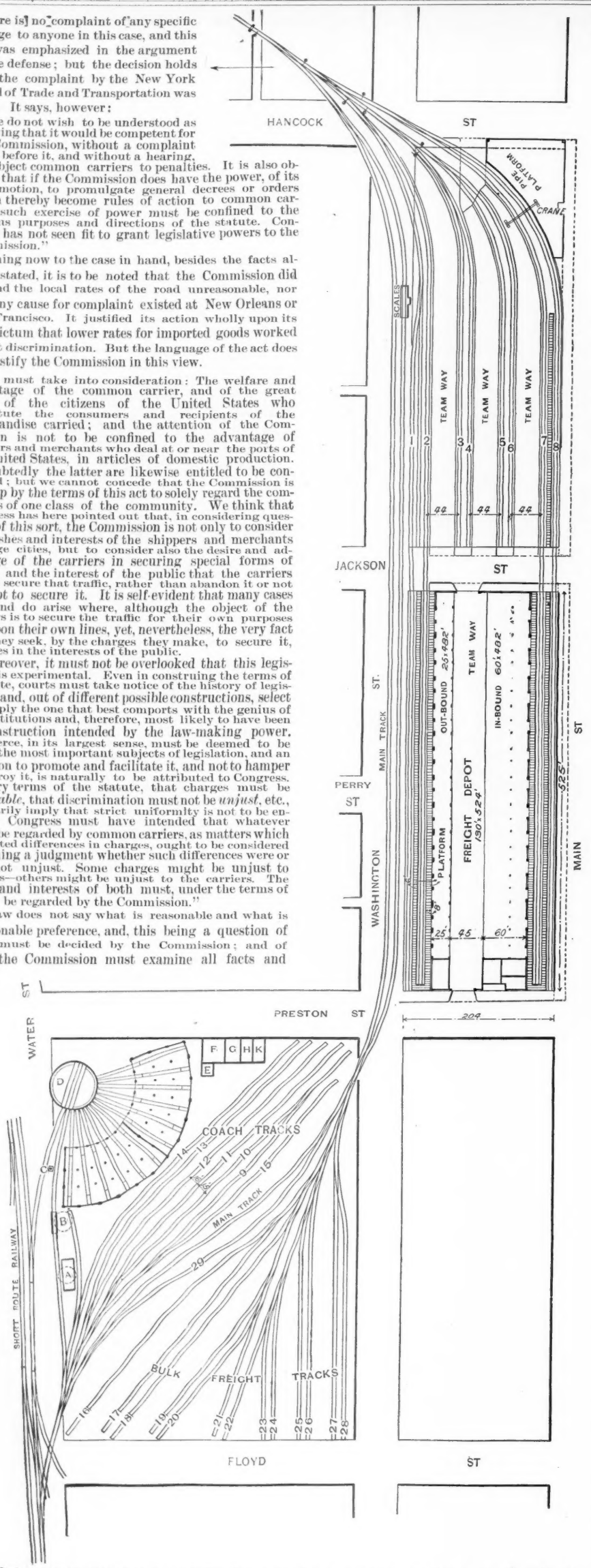
(This same decision is quoted in the Social Circle case.)

Judge Shiras sums up his conclusions as follows: That the purpose of the act is to promote and facilitate commerce by the adoption of regulations to make charges for transportation just and reasonable, and to forbid undue and unreasonable preferences or discriminations. That, in passing upon questions arising under the act, the tribunal appointed to enforce its provisions, whether the Commission or the courts, is empowered to fully consider all the circumstances and conditions that reasonably apply to the situation, and that, in the exercise of its jurisdiction, the tribunal may and should consider the legitimate interests as well of the carrying companies as of the traders and shippers, and in considering whether any particular locality is subjected to an undue preference or disadvantage the welfare of the communities occupying the localities where the goods are delivered is to be considered as well as that of the communities which are in the locality of the place of shipment. That among the circumstances and conditions to be considered, as well in the case of traffic originating in foreign ports as in the case of traffic originating within the limits of the United States, competition that affects rates should be considered, and in deciding whether rates and charges made at a low rate to secure foreign freights, which would otherwise go by other competitive routes, are or are not undue and unjust, the fair interests of the carrier companies and the welfare of the community which is to receive and consume the commodities are to be considered. That if the Commission, instead of confining its action to redressing, on complaint made by some particular person, firm, corporation or locality, some specific disregard by common carriers of provisions of the act, proposes to promulgate general orders, which thereby become rules of action to the carrying companies, the spirit and letter of the act require that such orders should have in view the purpose of promoting and facilitating commerce, and the welfare of all to be affected, as well the carriers as the traders and consumers of the country.

It may be said that it would be impossible for the Commission to frame a general order if it were necessary to enter upon so wide a field of investigation, and if all interests that are liable to be affected were to be considered. This criticism, if well founded, would go to show that such orders are instances of general legislation, requiring an exercise of the law-making power, and that the general orders made by the Commission in March, 1889, and January, 1891, instead of being regulations calculated to promote commerce and enforce the express provisions of the act, are themselves laws of wide import, destroying some branches of commerce that have long existed, and undertaking to change the laws and customs of transportation in the promotion of what is supposed to be public policy.

The Court does not decide what rates the Texas & Pacific ought to have charged. That is a question of fact; and the judge mildly intimates that the lower courts found it possible to sustain the Commission by refraining from going deeply enough into the questions involved. They dissented from the theories of the Commission, and yet decided against the road because the disparity in rates was very large.

"That question [degree of disparity] was not presented to the consideration of the court. There was no allegation in the Commission's bill or petition that the inland rates charged by the defendant company were unreasonable. That issue was not presented. The defendant company was not called upon to make any allegation on the subject. No testimony was adduced by either party on such an issue. . . . We do not, of course, mean to imply that the Commission may not directly institute proceedings in a court of the United States charging a common carrier with disregard of provisions of the act, and that thus it may become the duty of the court to try the case in the first instance. Nor can it be denied that, even when a petition is filed by the Commission for the purpose of enforcing an order of its own, the court is authorized to 'hear and determine the matter as a court of equity,' which necessarily implies that the court is not concluded by the findings or conclusions of the Commission; yet as the act provides that, on such hearing, the findings of fact in the report of said Commission shall be *prima facie* evidence of the matters therein stated, we think it plain that if, in such a case, the Commission has failed in its proceedings to give notice to the alleged offender, or has unduly restricted its inquiries upon a mistaken view of the law, the court ought not to accept the findings of the Commission as a legal basis for its own action, but should either inquire into the facts on its own account, or send the case back to the Commission to be lawfully proceeded in.



Freight Station and Yards at Louisville, Ky., of the Cleveland, Cincinnati, Chicago & St. Louis and the Chesapeake & Ohio Railways.

Designed by Mr. GEO. W. KITTREDGE, *Chief Engineer, C., C., C. & St. L. Ry.*

"The mere fact that the disparity between the through and the local rates was considerable did not, of itself, warrant the court in finding that such disparity constituted an undue discrimination—much less did it justify the court in finding that the entire difference between the two rates was undue or unreasonable, especially as there was no person, firm or corporation complaining that he or they had been aggrieved by such disparity."

Freight Terminals at Louisville of the Cleveland, Cincinnati, Chicago & St. Louis, and the Chesapeake & Ohio.

On Aug. 18, 1895, the Cleveland, Cincinnati, Chicago & St. Louis Railway Company began to work its passenger trains in and out of Louisville, having made a running arrangement with the Baltimore & Ohio Southwestern road for the use of its tracks between North Vernon and Jeffersonville, and to make use of the Louisville and Jeffersonville bridge from Jeffersonville into Louisville.

Louisville Freight House, Cleveland, Cincinnati, Chicago & St. Louis Railway.

Mr. GEO. W. KITTREDGE, *Chief Engineer.*

On Jan. 1, 1896, the same road began to operate its freight trains in and out of Louisville, and it was expected that on April 1 the Chesapeake & Ohio Railway Company would run its freight trains in and out of the same terminals used by the Cleveland, Cincinnati, Chicago & St. Louis Railway, it being a joint owner in them.

The terminals established in Louisville in addition to the main track, cover three squares of ground, and consist of coach yards, facilities for handling freight both in freight houses and on bulking tracks, an engine house, a building for heating purposes, a storeroom, coal dock, ash pit, turntable, etc.

Considering the ground which was available for the purpose, remarkably good use has been made of the territory covered. The square bounded by Washington, Floyd, Front and Preston streets contains the engine house and necessary adjuncts, the coach yard and a bulk freight yard with an ultimate capacity of 80 cars. The square bounded by Main, Preston, Washington and Jackson streets contains the freight house with tracks adjacent, which will hold 56 cars. The square bounded by Main, Jackson, Washington and Hancock streets contains a second bulk freight yard and some storage tracks with a capacity of 87 cars, a pipe platform and transfer crane.

The engine house is a modern brick structure similar in general design to a number of engine houses recently constructed on the line of the Cleveland, Cincinnati Chicago & St. Louis Railway and contains 12 stalls.

The passenger coach yard is conveniently arranged near the engine house and storeroom and is fully equipped with pipes for furnishing air, steam, water and electricity.

The freight house proper is of brick with stone base courses and has been so designed as to accommodate the business of both the Cleveland, Cincinnati, Chicago & St. Louis Railway and the Chesapeake & Ohio roads and is deserving of special mention not only on account of its magnitude, but of the details of construction and arrangement. It is abundantly lighted by numerous windows in the clerestory and by sky-lights in the flat portion of the roof.

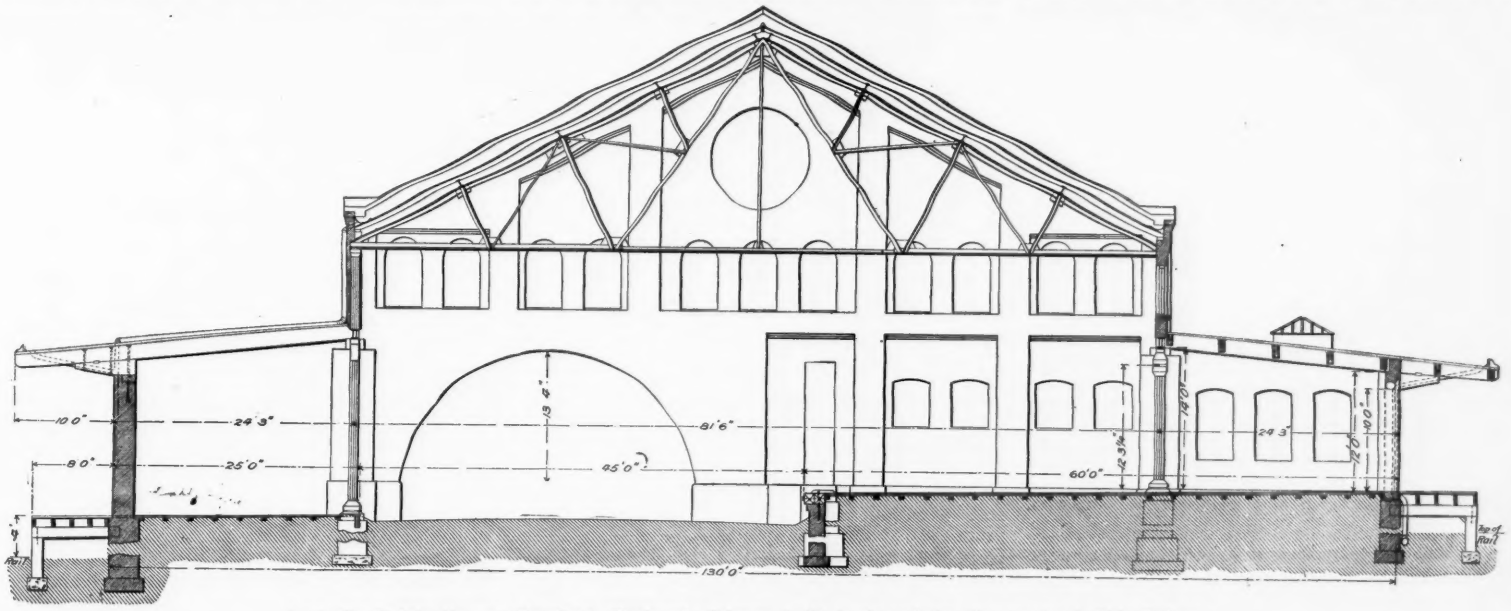
In general the building within the exterior walls is 525 ft. long by 130 ft. wide. It covers and encloses a driveway 45 ft. in width throughout the entire length of the building which is flanked on the one side by a platform 60 ft. wide for inbound business and on the other by a platform 25 ft. wide for out-bound business. The floors of these platforms are of 1½-in. maple, laid diagonally upon 1⅛-in. tongued and grooved hard pine nailed to sleepers bedded in a layer of dry engine cinders upon solidly rolled and tamped earth. The doors are rolling steel doors made by Mr. James G. Wilson, of New York.

Outside of the house proper are platforms having an area of 15,700 sq. ft., and consisting of one platform 8 ft. in width on each side connected directly with the house, and another 6 ft. in width located between the two tracks which have been built on each side of the station. On the south side of the building, south of the second track, is a paved driveway, so that the track can be used either for cars which are to be unloaded into the house or which are to be loaded and unloaded by teams. The main part of the freight house, 80 ft. in width, is built of steel for its entire length with a slate roof. On each side of this main portion the roof for 25 ft. is lower, and built of heavy timber and covered with gravel. The west end of the building has been carried two stories in height, and in this ample provision has been made for local offices.

The freight tracks between Hancock and Jackson streets are arranged in pairs, 12 ft. on centers and the driveways 30 ft. in width, are paved with vitrified brick upon concrete foundation. The curves at the east end of this yard where the tracks diverge from the main track vary in curvature from 14 deg. 30 min. to 27 deg.

At the northwest corner of Hancock and Main streets a large platform has been provided for handling pipe and heavy machinery. In connection with this, and extending over the two tracks next adjoining, is a transfer crane with a capacity of 20 tons.

The terminals and buildings are very complete for the purpose for which they were designed, and the plans for them were designed and executed under the direction of Mr. George W. Kittredge, Chief Engineer of the Cleveland, Cincinnati, Chicago & St. Louis Railway Company.



Louisville Freight House—Cleveland, Cincinnati, Chicago & St. Louis and the Chesapeake & Ohio Railways.

Railroad Legislation in New Jersey.

Among the laws passed by the Legislature of New Jersey recently adjourned, is Chapter 9, prescribing the manner of dissolving railroad corporations whose lines have been wholly abandoned for five years. Ninety per cent. of the stock must join in the proceedings and the directors are to act as Trustees to convert all property and assets into cash, to be then equitably divided.

Chapter 59 extends the time for the construction of street railroads, under the act of April 6, 1886. Where the prescribed time expires during 1896 it is extended for one year, provided money has actually been expended in the construction of the road.

Chapter 104 amends the act of March 10, 1893, authorizing the formation of street railroad companies. Section 12 of that act now regulates the re-payment to the company of the $25,000 deposited on organizations; and if the company does not get its local franchises within a year, the money may be returned, and thereupon the company loses its right of priority.

Chapter 97 is the Voorhees law to provide for the abolition of grade crossings between streets and railroads in cities of the first class [Jersey City and Newark] As this is of considerable importance, and different in details from laws of this nature heretofore passed in other states, we give it in full.

NEW JERSEY GRADE CROSSING LAW.

Be it enacted, etc.:

1. Whenever in any city of the first-class the council or other governing board, which has the power to permit railroads to cross the streets at the grade thereof, shall by resolution, approved by the mayor, declare that any existing railroad crossings of any street or streets in said city have become unsafe and inadequate for the accommodation of the public, the city may by petition apply to the supreme court for an order compelling the abolition of such crossings; a copy of said petition, with a notice of the time when it will be presented, shall be served, either within or without the state, upon the railroad company or companies on whose railroad or railroads said crossings exist, and on any railroad company, the grade or location of whose railroad shall be affected by the proposed changes, at least ten days before the presentation of the petition; said court shall proceed to hear said petition and the proofs and allegations on behalf of the city and the company or companies in such manner as the court shall direct, and if it shall appear to the court that the said crossings, or some of them, ought, for the safety or adequate accommodation of the public, to be abolished, changed or altered, and that it is feasible without unreasonable cost to make such changes and that such changes are practicable, the court shall make an order appointing three discreet persons, at least one of whom shall be a resident of said city, to be commissioners to examine into the matter and report which, if any, of said crossings ought to be abolished, re-located or otherwise changed, and how such changes should be made, and what changes of grade of streets, if any, should be made, and what clearance each street should have, what streets or parts of streets, if any, should be opened, closed, narrowed, widened, altered or re-located, and what change of grade or location, if any, of the railroads or other railroads affected by reason of crossing or intersecting the same should be made, and within what time such work should be commenced and completed, and what would probably be the cost or expense thereof to the city and to the company or companies under the apportionment hereinafter provided for.

2. The commissioners shall forthwith give notice to the city and the company or companies to appear before

them, and shall afford opportunity for the presentation of plans and statements as to the method to be adopted for the abolition of grade crossings and the other changes and alterations required; and after hearing the representatives of the city and the company or companies interested, they shall adopt plans, and report the same to the court; and they may accompany their report with maps and profiles; the report shall contain the recommendation of the commissioners as to each crossing, including all the matters required by the first section of this act to be referred to them; they may adopt the plans, maps and profiles prepared by the city or by the company or companies or any modification thereof; said report, plans, maps and profiles shall be filed in the office of the clerk of the supreme court within 60 days from the date of the appointment of commissioners, or within such time as the court may fix, and the court shall thereupon fix a day for hearing all persons interested in said report, of which the petitioner shall forthwith give notice by advertising the same for ten days, in at least one newspaper of said city and by serving the same upon the other party or parties at least ten days before the hearing.

3. Upon the day so fixed the court shall hear the representatives of the city and the company or companies and of all parties interested, and adopt, alter, modify or reject the plan presented or any part thereof, and make

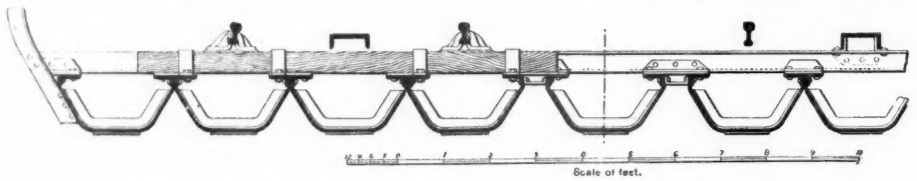


Fig. 1.—Barker's Trough Flooring for Short Spans—Troughs Placed Longitudinally.

such order in respect to the matter presented by such petition as shall appear just, reasonable and proper, and if the court shall require any work to be done they shall enter an order directing the city and the company or companies to carry out and perform the same within the time and in the manner and under the regulations provided therein; said order when entered shall have the force and effect of a judgment of the court; and it shall be the duty of the city and the company or companies to proceed and comply with and in all respects carry out and perform the plan so adopted; and either the city or the company or companies may by mandamus issuing out of the supreme court or by other appropriate process, be compelled to perform and carry out the said order, and to do and perform all things therein required of them respectively; and every city and railroad company coming within the provisions of this act shall have power and authority to proceed to make and carry out the changes and works required by such judgment; and any damages required to be paid by such city by reason of such changes shall after the completion of the work be ascertained and paid by the city in the manner prescribed by the charter of such city; and the city and the railroad company shall respectively have power to acquire by condemnation or otherwise in the manner prescribed in their respective charters all such additional lands as may be necessary to carry out the plan adopted by the court; no changes of grade shall be adopted which will seriously impair the economical operation and carrying capacity of the railroad.

4. Any city required by such order to do any works or to answer any damages provided for in such report and order may provide the cost thereof by the levy of a general tax for one or more years or by the issue and sale of bonds of the city to run not exceeding 20 years, at a rate of interest not exceeding five per centum, such bonds otherwise to be of such form and terms and conditions as the city may adopt, and the city shall have power, by annual taxation or otherwise, to provide a sinking fund for the retirement of said bonds.

5. When the court shall order the doing of any work or the making of changes under this act, the cost thereof shall be apportioned as follows: The city shall make all necessary changes of gas pipes, water pipes, sewers and conduits; the city shall also be charged with the cost of the change of grades of streets and the restoration and repaving of the surface of such streets and the re-location of streets and the laying out and opening of new streets so far as such changed or newly-opened streets lie outside of the lines of the right of way of the railroad company or companies, but the actual work upon such streets may be done either by the city or by the railroad company, as the court may direct; and the city shall be charged with the lawful claims for compensation and damages, if any, to property other than the property of the railroad company or companies, by reason of the changes of grades and locations of streets and the laying out of new streets and the acquiring of property therefor, outside of the property of the railroad company; and all work and all cost and expense not so charged upon the city shall be borne by the railroad company or companies owning or operating such railroad or railroads, in such proportions as the court may fix, and where two or more companies are interested in the same railroad as owners, lessees or otherwise, they shall be jointly and severally liable to do the work and bear the expense so determined upon, subject, however, as between themselves, to contribution according to their respective contract rights and relations; the compensation and expense of said commissioners shall be fixed and allowed by the court and be apportioned between the city and the company or companies in such manner as the court shall deem proper.

6. Proceedings for the abolition or alteration of grade crossings under this act may be instituted by petition by any railroad company interested, on notice to the city and to any other railroad company interested, with the same force and effect as if the same had been instituted by the city in the manner provided in the first section of this act.

Sec. 7 provides that this act shall not affect the right of cities to contract with railroads for separation of grades, as heretofore, under the law of March 19, 1874.

Barker's Bridge Floor.

While the solid bridge floor has received considerable attention in this country it has been used much more abroad. A new steel flooring has been designed by Mr. Gerald Barker, of Westminster, England, which has some novel features. It is described in *The Engineer* for Jan. 24. Like many other systems of this kind it composed of bent plates, forming troughs. These are placed side by side and an angle is riveted to each side of the ridge formed by the abutting sides of two adjacent trough plates (see Fig. 1). In the case of short spans these troughs are laid longitudinally. Transverse Z irons are riveted to the top of the flooring midway between the transverse ties. The latter are clamped down to bearing plates on the trough tops by clips, which pass over the ties. Drainage holes are provided at each end of every trough, so that water may be drained into transverse gutters fastened to the face of the abutments. Guard rails of inverted channel section, as shown in Fig. 1, are riveted to the transverse Z irons. Between the Z bars and the flooring packing plates of various thicknesses are inserted.

In an ordinary plate girder bridge the troughs are placed transversely, and their ends are cut at a slope of about 30 degs. Curved angles are riveted to these sloping edges on the inner sides of the trough. Other angles, riveted to the outer sides of the trough plates, extend down the slope and a short distance along the sides of the trough plates, near the bottom. Short plates are riveted across the cut sloping ends of the troughs and riveted to the outside bent angles before erection. This is clearly shown in Fig. 2. These plates equal in width the sum of the widths of the inner and outer angles, plus the thickness of the trough metal. Short lengths of trough are riveted to the webs of the main girders in the shop, and the projecting ends of these lengths are faced up, inside and out, with angles, as in the case of the longer troughs. When the ends of the long and short troughs are placed opposite each other, rivets are put through the facing angles on the inside of the troughs, the flat plate, previously referred to, coming between them as a filler. These connections are made by a riveting machine in the field, and all field riveting through the main girder webs is avoided.

As will be seen from the engraving, the top table of the flooring, when the latter is placed transversely, is formed by two angles extending parallel to the webs of the two main girders. Angles are riveted horizontally between the stiffeners along the webs of the main girders and a connection is made between these angles and the angles forming the top tables of the troughs by means of a flat horizontal gusset plate. A longitudinal gutter is attached to the inside edge of the bottom flange of each of the two main girders into which the troughs drain, downspouts being provided at each of the four corners of the bridge.

Fig. 2 shows a method of using Z bars for guard rails on each side of the rail. With two lines of track there would thus be eight Z bars which give considerable lateral support to the top tables of the flooring.

If ties are used with this flooring they are supported on longitudinal timber blocks of the same section as the ties. These blocks rest either on bearing plates suspended in a pair of transverse loops, or in stirrups composed of flat bars, the upper ends of these loops or stirrups being riveted to the webs of the longitudinal Z bars, as shown in Fig. 2. The ties are held down on their respective packings by means of wedges driven in between the tops of the ties and inclined angle irons riveted to the webs of the Z bars, as shown at *C*, Fig. 2. This avoids the use of bolts.

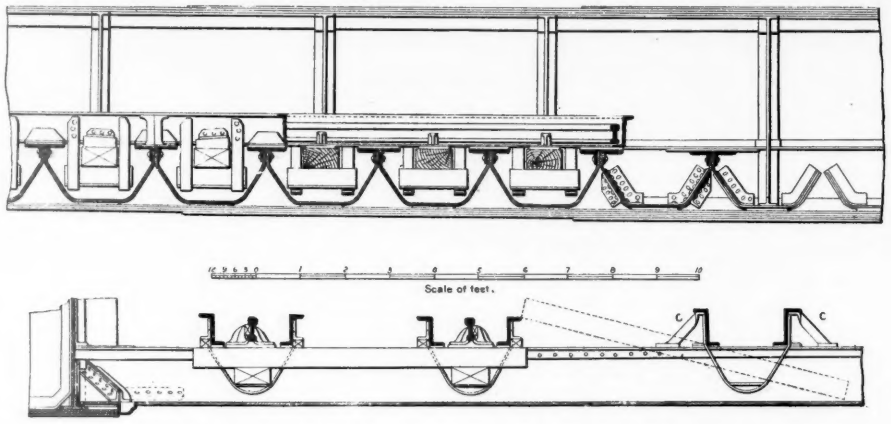


Fig. 2.—Barker's Trough Flooring for Bridges—Troughs Placed Transversely.

An advantage claimed for this floor, which, by the way, is not confined in its use to plate girder bridges, is that the entire operation of erecting can be carried out without any scaffolding alongside or underneath the bridge. The erecting is generally done with overhead derricks, a portable steam riveting plant, especially designed for riveting this flooring by Messrs. DeBergue & Co., Limited, of Manchester, being used for the erecting.

A claim made for the floor which, as we have shown, requires no ballast, is that the doing away with the ballast prevents rusting of the troughs from this cause and reduces the weight of the bridge, thus reducing its cost. As will be seen in Fig. 1, the load is well distributed, since each tie crosses four top tables. This, however, is only secured where the span is short and the troughs run longitudinally. Where the troughs are crosswise, as in Fig. 2, the load on any tie is equally divided between eight points, on the two adjacent top tables, since the stirrups supporting the short longitudinal timbers under the ties give 8 points of distribution for any one tie. Supposing the Z-bars themselves to distribute part of the load this distribution is even better. A further advantage claimed for the flooring is that every part of it is accessible for inspection and painting; that any tie can be removed without interrupting traffic by wedging up the rails from adjacent top tables and removing the wedges holding the tie. No contact is had between timber and metal, which has often been known to cause corrosion through acids in the wood. It is also thought that the timber between the under side of the rail chairs and the stirrup will afford a very elastic cushion.

Railroad Legislation in South Carolina.

The legislature of South Carolina, which recently adjourned, passed six laws affecting railroads. Bill No. 109 amends section 1605 of the revised statutes, so that it reads: No railroad corporation which has previously issued bonds shall subsequently make or execute any mortgage upon its road, equipment and franchise, or any of its property, real or personal, without including in and securing by such mortgage all bonds previously issued, and all pre-existing debts and liabilities of the corporation; *Provided* that nothing in this section contained shall apply to a mortgage for the purchase money of any such road equipment, franchise or property, real or personal. The amendment consists in the addition of the words after "Provided."

No. 138 requires railroads to advance charges on freight offered by another road, provided they are just, and are not more than half the market value of the property, and provided the freight is not of one of the kinds classed as "prepaid freight," and is not going to a "prepaid" station. It is also provided that the company paying the charges shall be afforded, by the other company, the same interchange advantages afforded any other railroad at the same point. The same law requires every railroad to afford reasonable and equal facilities for interchange between its own and other roads.

Bill No. 82 fixes first-class passenger fares at 3¼ cents a mile and second-class at 2¾, and requires the railroads to sell first and second-class tickets. The Railroad Commissioners may alter these rates on any road or roads when circumstances warrant. No. 152 makes it the duty of the Railroad Commissioners to examine the schedules of passenger trains to see if the railroads can make close connection at junctions, and where necessary, give an order that such connection shall be made. The railroads have the right of appeal to the courts. Section 3 imposes a penalty of $500 on any road refusing to obey an order of the commissioners under this law. Another act requires outside railroad companies to file a copy of their charters with the Secretary of State, and also with the appropriate officer in each county traversed by the road; and when this law is complied with, the corporation shall, *ipso facto*, become a domestic corporation, may sue and be sued, etc. Attempting to do business without complying with this law subjects the offender to a penalty of $500. If a charter filed, or any part thereof, is in contravention of the laws of South Carolina such charter or part becomes void.

Act No. 194 requires different railroads controlled by the same person, firm or corporation to be treated as one and the same road in computing rates, unless otherwise ordered by the Railroad Commission.

Act No. 80 is a bill of eight sections, intended to keep railroads from discriminating against one another at connections. It is long and the wording is involved, but the substance of it is that each road must receive cars from connections without discrimination, must recognize through bills of lading and rates on equitable conditions, and must not demand a higher proportion of a through rate from one line than from another. With a view of being not only fair, but generous, the framer of the bill introduces a proviso that nothing contained in it shall prevent a railroad from demanding prepayment in such cases. There is a section requiring each road to afford reasonable facilities to its connections, and one giving shippers the right to route their own goods. Vio-

lation of the law subjects the person or railroad to fine or imprisonment, or both.

The proposed law requiring separate passenger cars for colored passengers, and one regulating the hours of labor of railroad employees, failed to pass.

Inspection Locomotive for the St. Lawrence & Adirondack Railway.

The Schenectady Locomotive Works have recently built for Dr. W. S. Webb, President of the St. Lawrence & Adirondack Railway Co., an inspection locomotive, an engraving of which we print made from a photograph. The descriptive specifications follow. This locomotive was designed especially for track inspection. It has power enough to take a private car weighing 120,000 lbs. over any grade on the line. The inspection room is handsomely finished in mahogany and has chairs for six persons. The general features of the engine are the same as those of the engine "Hudson" designed and built by Mr. Buchanan, Superintendent of Motive Power of the New York Central & Hudson River Railroad, for use on that road, a design which has been found very satisfactory in service.

DESCRIPTIVE SPECIFICATION OF SCHENECTADY INSPECTION LOCOMOTIVE.

Gage	4 ft. 8½ in.
Fuel	Bituminous coal
Weight in working order	78,700 lbs.
" on drivers	49,700 lbs.
Wheel base, driving	7 ft. 4 in.
" " rigid	7 ft. 4 in.
" " total	20 ft. 10 in.

Cylinders.

Diam. of cylinders	14 in.
Stroke of piston	22 in.
Horizontal thickness of piston	4¾ in.
Diam. of piston rod	2¾ in.
Kind " packing	Cast iron rings.
" " rod packing	U. S. metallic.
Size of steam ports	12 in. × 1¾ in.
" exhaust ports	12 in. × 2½ in.
" bridges ports	1⅛ in.

Valves.

Kind of slide valves	Allen-American balanced
Greatest travel of slide valves	5 in.
Outside lap " " "	1⅛ in.
Inside clearance " " "	1/16 in.
Lead of valves in full gear	1/16 in. lead in full gear forward, ⅛ in. lap in full gear back motion
Kind of valve stem packing	U. S. metallic

Wheels, etc.

Diameter of driving wheels outside of tire	62 in.
Material " " " centers	Cast steel
Tire held by	Shrinkage and retaining rings
Driving box material	Steeled cast-iron
Diameter and length of driving journals	6½ in. diam. × 8 in.
" " " " main crank pin journals	4 in. diam. × 4 i .
" " " " side rod crank pin journals	3½ in. diam. × 3¼ in.
" " " " engine truck journals	5 in. diam. × 8 in.
Kind of engine truck	4 wheel rigid center
Diameter of engine truck wheels	28 in.
Kind " " " "	Krupp cast-iron spoke center, tire with retaining rings.

Boiler.

Style	Wagon top
Outside diam. of first ring	42 in.
Working pressure	180 lbs.
Material of barrel and outside of firebox	Carbon steel
Thickness of plates in barrel and outside of firebox	7/16 in. and ½ in.; throat, 9/16 in.
Horizontal seams	Quadruple riveted, with welt strip inside and outside, butt joints
Circumferential seams	Double riveted
Firebox, length	58 5/16 in.
" width	34⅜ in.
Firebox, depth	36 in.
" material	Carbon steel
" plates, thickness, sides, 5/16 in.; back, 5/16 in.; crown, 3/8 in.; tube sheet, ½ in.	
" water space	4 in. front, 3 in. sides, 3 in. back
" crown staying	4⅛ × ¾ in. bars, welded at ends
" staybolts	⅜ in. and 1 in. diam. U. S. iron
Tubes, material	Charcoal iron No. 11 W. G.
" number of	128
" diameter	2 in.
" length over tube sheets	10 ft. 7 in.
Firebrick, supported on	Studs
Heating surface, tubes	703.7 sq. ft.
" " water tubes	— "
" " firebox	80 "
" " total	783.7 "
Grate surface	13.89 "
" style	Rocking
Ash pan, style	Plain, with dampers front and back
Exhaust pipes	Single
" nozzles	3¼ in., 3⅜ in., 3½ in. diam.
Smoke stack, inside diameter	Straight, 11½ in.
" top above rail	14 ft. 3 in.
Boiler supplied by	Two monitor injectors No. 6 R. & L.

Tender.

Weight, empty	33,250 lbs.
Wheels, number of	8
" diameter	33 in.
Journals, diameter and length	4½ in. dia. × 8 in.
Wheel base	13 ft. 11½ in.
Tender frame	S. L. W. standard, 6½ in. × 4 in. × ¾ in. angle iron.
Tender trucks	S. L. W. standard, channel iron, center bearing, front and back
Water capacity	2,500 U. S. gallons
Coal "	5 tons
Total wheel base of engine and tender	41 ft. 1 in.
" length " " "	48 ft. 7 in.

Engine equipped with:
Westinghouse automatic air-brake on drivers, tender, and for train.
Westinghouse American engine truck brake.
Westinghouse engineers' air signal.
Magnesia sectional boiler covering.
Two Williams' round case headlights.
Leach patent sand feeding apparatus.
Gould coupler on pilot and rear of tender.
Le Chatelier water brake on cylinders.
Consolidated steam car heating apparatus.
Boyer speed recorder.

Boiler Explosions During 1895.

We present below a summary of the boiler explosions that occurred in the United States during the year 1895, together with the number of persons killed and injured by them.

It is difficult to make out accurate lists of explosions, because the accounts of them that we receive are often unsatisfactory. We have spared no pains, however, to make this summary as nearly correct as possible. In making out the monthly lists from which it is abstracted it is our custom to obtain a large number of accounts of each explosion, and to compare these different accounts diligently, in order that the general facts may be stated with some considerable degree of accuracy. It may be well to add, too, that this summary does not pretend to include *all* the explosions of 1895. In fact, it is probable that only a fraction of these explosions are here represented. Many accidents have doubtless happened that were not considered by the press to be sufficiently "newsy" to interest the general public; and many others, without doubt, have been reported in local papers that we do not see.

The total number of explosions in 1895 was 355, against 361 in 1894, 316 in 1893 and 269 in 1892. In a few cases more than one boiler has exploded at the same time. When this has happened, we have counted each boiler separately, as heretofore, believing that in this way a fairer idea of the amount of damage may be had.

The number of persons killed in 1895 was 374, against 331 in 1894, 327 in 1893 and 298 in 1892; and the number of persons injured (but not killed) in 1895 was 519, against 472 in 1894, 385 in 1893 and 442 in 1892.

It will be seen from these figures that during the year just elapsed there was, on an average, nearly one boiler explosion a day. The number of persons killed per explosion was 1.06; the number of persons injured (but not killed) per explosion was 1.47; and the total number of killed *and* injured, per explosion, was 2.52.

There was no explosion in the United States during 1895 that could compare, so far as the number of boilers involved is concerned, with the great Shamokin explosion of 1894. The explosion at Redcar, England, on June 14, 1895, described in our issue of September, 1895, was the greatest explosion of the year in this respect. But if we pass to the consideration of the *number of persons killed and injured*, we find that our own record exceeds that at Redcar in two cases. There were 12 persons killed and 20 injured at Redcar: while in the explosion at the Gumry Hotel, Denver, Col., on Aug. 19, there were 22 persons killed and 7 injured, and in the great explosion of the *Evening Journal* building, at Detroit, Mich., on Nov. 6, there were 37 persons killed and 20 injured.—*The Locomotive.*

Chicago & Northwestern Locomotive Testing Plant.

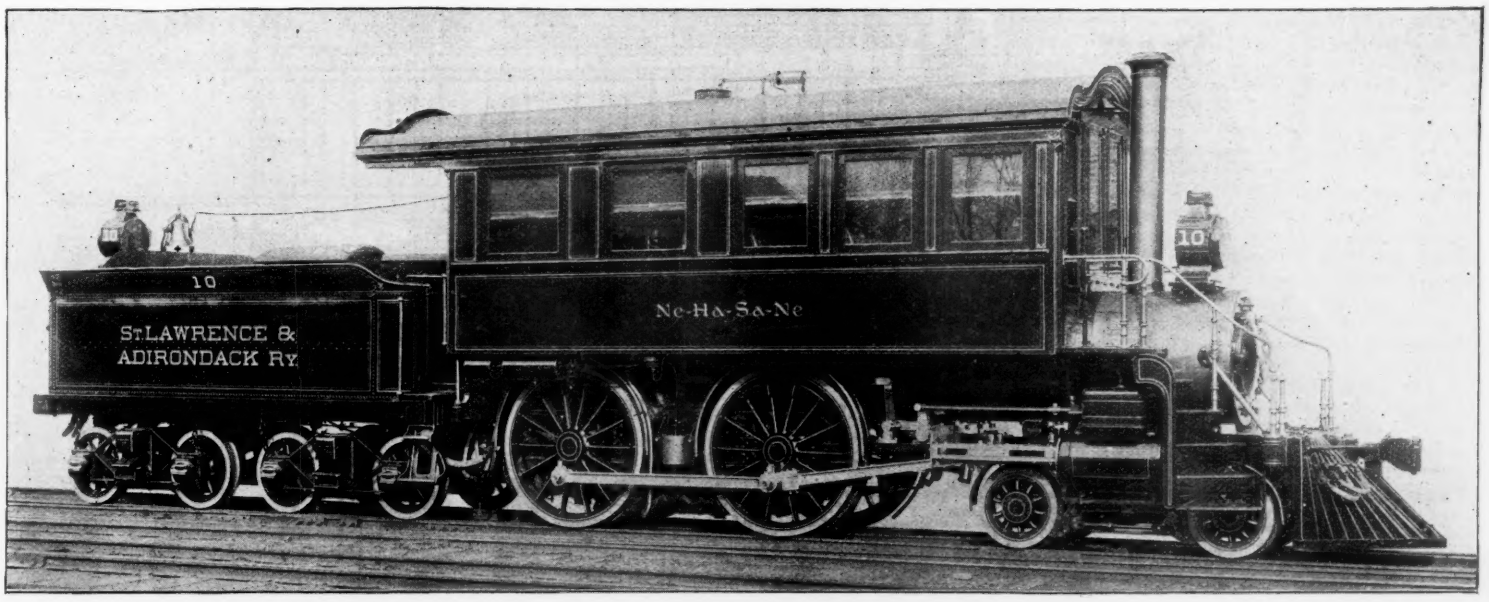
A plant for testing locomotives was erected in the round house of the Chicago & Northwestern Railway company's shops at West Fortieth street, Chicago, during the summer of 1895. The plans for it were made by Mr. Robert Quayle, Superintendent of Motive Power, and Mr. E. M. Herr, Assistant Superintendent of Motive Power, to whom we are indebted for these drawings. Mr. Quayle had previously had experience with a locomotive testing plant at South Kaukauna, Wisconsin, where tests were made by the Committee of the Master Mechanics' Association who were investigating the subject of exhaust pipes and nozzels. This plant was, however, only a temporary one. The acknowledged value of shop tests of locomotives in determining their efficiency and performance, under constant conditions which cannot be obtained on the road, and the desire to obtain a place to prove, or "brake in" locomotives before sending them out on the road led to the erection of this permanent plant.

The testing plant occupies one stall in the roundhouse, the two adjacent tracks being used for tenders supplying the coal and water when an efficiency test is being run. A platform is built from the tender to the footboard of the engine to facilitate handling coal. The coal is loaded in a wheelbarrow at the tender, and, after being weighed on a platform scales is wheeled across the platform to the locomotive. The scales is placed beneath the platform and has three posts or projections extending up through the platform about one inch. On these posts are placed the wheel and two legs of the wheelbarrow while weighing. The water is now drawn from a tender tank which is calibrated, but it is the intention to build a large tank especially for this purpose.

There are carrying wheels on which the drivers of the locomotive rest; the axles of these carriers have on their ends cast-iron wheels, with Prony brakes for absorbing the power. These brakes are applied by 6-in. cylinders worked by compressed air. A sheet-iron casing surrounds the Prony brakes, and contains the circulating water used to carry off the heat generated. The engine is held in position by attaching it with a rod to a strongly constructed framework in the rear. This framework is in the form of a buffer strongly anchored with 1¼-in. rods, and takes up the pull while the engine is running.

Fig. 1 is a general drawing of the plant without the piping. The layout of this piping is shown in Fig. 2. The pit is 15 ft. wide and 28 ft. 3 in. long. The bottom is covered with gravel 18 in deep and drained to the center. In this gravel are laid 8-in. × 10-in. × 14 ft. crossties, giving the same effect as in a good road bed. On top of these ties are 16-in. × 16-in. longitudinal timbers 25 ft. long, carrying cast-iron bed plates 14 in. wide 4 in. thick. These bed plates carry the cast-iron journal boxes for the axles of the carrying wheels and have a rack and two "T"-shaped slots. Into this rack gears a small pinion attached to the journal box and the heads of the journal box bolts are held in the "T" slot. By this means a motion of the boxes along the bed plates is permitted and their adjustment under the drivers of the locomotive is made. The necessary flexible air and water pipe connections are made by hose in order to permit the movement of the boxes along the bed plates. At present there are only three pairs of carrying wheels, but provision has been made for the introduction of a fourth pair should it be necessary to test a consolidation engine. An adjustable hood is attached to the bottom of a short iron smokestack and it can be lowered into position over the stack of the locomotive to carry away the smoke.

The system of piping for both air and water is shown in Fig. 2 The compressed air is supplied from the shop plant and a pressure of 60 lbs. is ample. The air from the compresser is led into a 12-in. × 33-in. reservoir. Thence it is piped by ¾-in. pipe through a small throttling governor and out to the brake cylinders as shown, the necessary hose connections being made to permit the adjustment of boxes. This governor is belted to a split pulley on the axle of the rear pair of carrying wheels and by the use of pulleys of suitable sizes on the governor, the air pressure in the brake cylinders is regu-



Inspection Locomotive for the Adirondack & St. Lawrence Railway.

Built by the SCHENECTADY LOCOMOTIVE WORKS, *Schenectady, New York.*

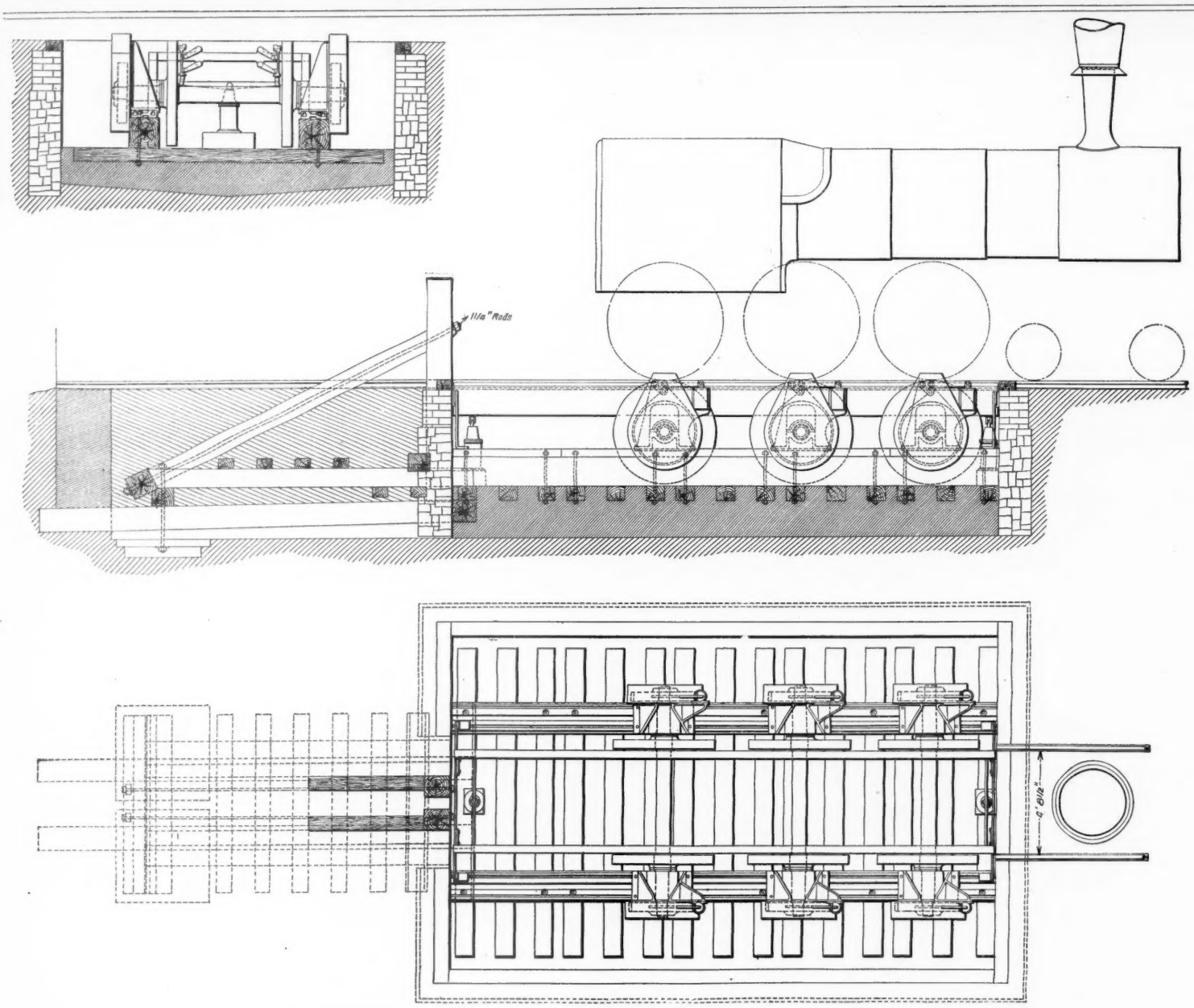
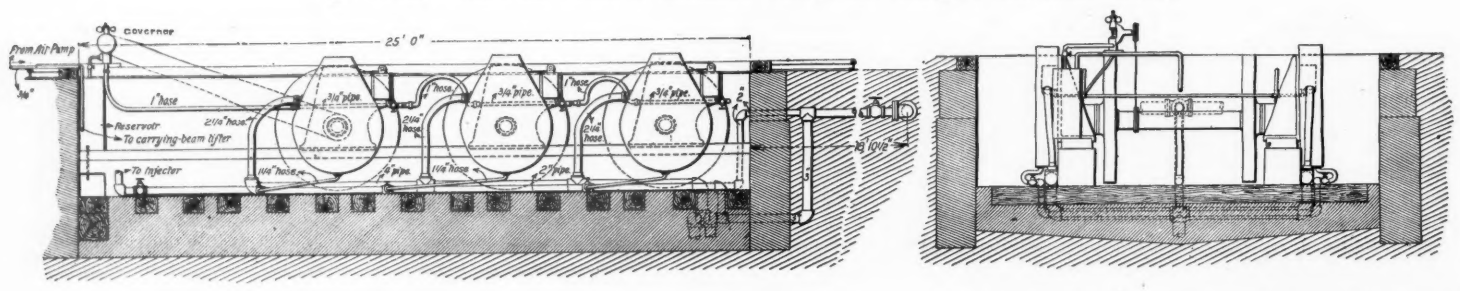


Fig. 1.—Plan, Elevation and Section of Locomotive Testing Plant—Chicago & Northwestern Railway.



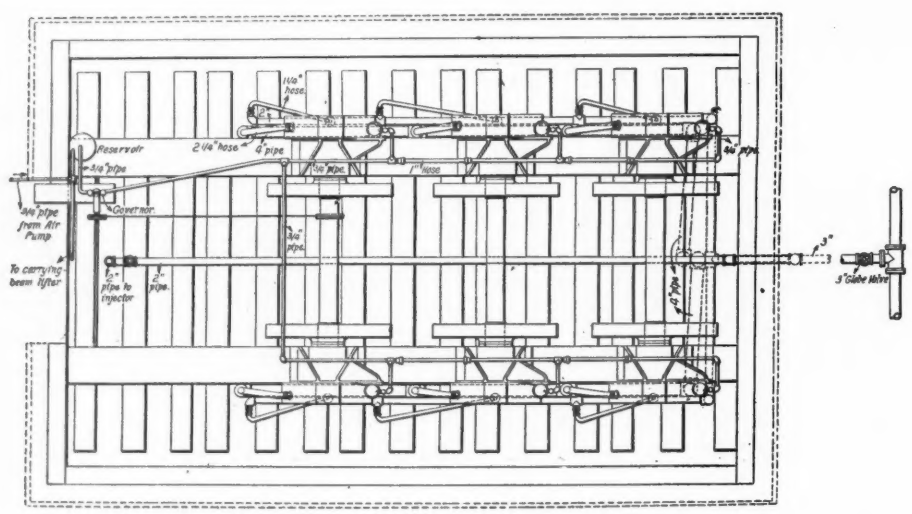


Fig. 2.—Plan, Elevation and Section Showing Piping.

lated to give any required speed for the locomotive. This method of regulation has been found to be very effective.

The water, both for the boiler and to cool the Prony brakes is obtained through the 3 in. pipe shown in front of the pit in the plan and elevation, Fig. 2. The feed water pipe runs down the center of the pit to the rear, where it is upturned to connect with the feed water to the injector. After the feed pipe enters the pit it branches with two 2-in. pipes to the brake wheels on both sides. Connections are made with 1¼-in. hose to nipples placed at the bottom of the sheet-iron coverings surrounding the Prony brakes. The overflow from these casings is led by a 2¼-in. hose connection to a 4-in. drain placed in both sides of the pit. The necessary valves for cutting off the air and water from any pair of carrying wheels are provided.

Fig. 3 is a detail of the arrangement of carrying wheel and brake. The carrying wheels are old 56-in. drivers with plain steel tires. The inner edge of the tires is turned with a radius corresponding to the radius of the inner corner of the rail head. The carrying axles have journals 8 in. × 16 in. and project beyond the boxes to hold the 33-in. cast-iron brake wheels. These wheels have chilled tires. The Prony brake is made by attaching the ends of a ¼-in. × 5½-in. steel band to the arms of a bell crank lever, which is fulcrumed to the box casting as shown. The longest arm of the lever is attached to the piston rod of a 6-in. air cylinder. As shown in the drawing the ends of the band are so attached as to get the minimum braking power. Two other holes in the lever are provided for attaching the band when more power is required. This steel band holds a number of cast-iron shoes in position against the wheel, the shoes having lugs on their backs which project through holes in the band and are held by split pins. The air cylinder is a single-acting push cylinder, receiving the air from the bottom through a ¾-in. pipe tapped into the head. The piston has the ordinary leather cup packing and is made long enough to move without binding, and so dispenses with guides. A shut-off valve is placed close up to the cylinder to throw it out of operation when desired. The inlet and overflow pipes for the cooling water are shown, though the 2¼-in. hose connecting the overflow with the 4-in. drain is here omitted. A very ingenious packing box is provided to prevent the entrance of the water into the journal box of the carrying axle, but it is not clearly shown here.

In order to test a large number of engines coming out of the shops, it was necessary to have a quick way of placing them on the testing plant and removing them from it. This has been accomplished by an exceedingly neat device which is shown in Figs. 4 and 5. On the inside of the carrying wheels are placed two 15-in. I-beams 25 ft. long. The outer flanges of these beams are cut

away as shown, and on top of each is an iron strap rail, 2⅛ in. × 3½ in., having a groove near its outer edging. The shape of this groove closely corresponds to the outline of the flange of the drivers. These I-beams are supported at both ends by the links *D*, Fig. 4, attached to the iron bar *C*, which is raised and lowered by an 8-in. air cylinder. The links *B* attached to the stationary bar *A* and to the I-beams serve as guides for the latter. In Fig. 4 the I-beams are shown in their lowest position. By an application of air to the cylinder the bar *C* is raised, thus elevating the I-beams which are guided outward into position against the sides of the carrying wheels as shown in Fig. 5. When in this position the bottom groove in the strap rail is ¼ in. lower than the top of carrying wheels. The I-beams are now blocked up by pieces of oak resting on the axles of the carrying wheels, and are secured to these wheels by clamps. A locomotive can now be run on to the testing plant, the flanges of the drivers running in the grooves of the strap rail. As the tops of carrying wheels are ¼ in. higher than the bottom of the grooves, the weight of the engine is taken off the *I*-beams as soon as it is in position, and they are then dropped to their ordinary position. These "disappearing tracks" make the operation of placing an engine on the testing plant extremely simple.

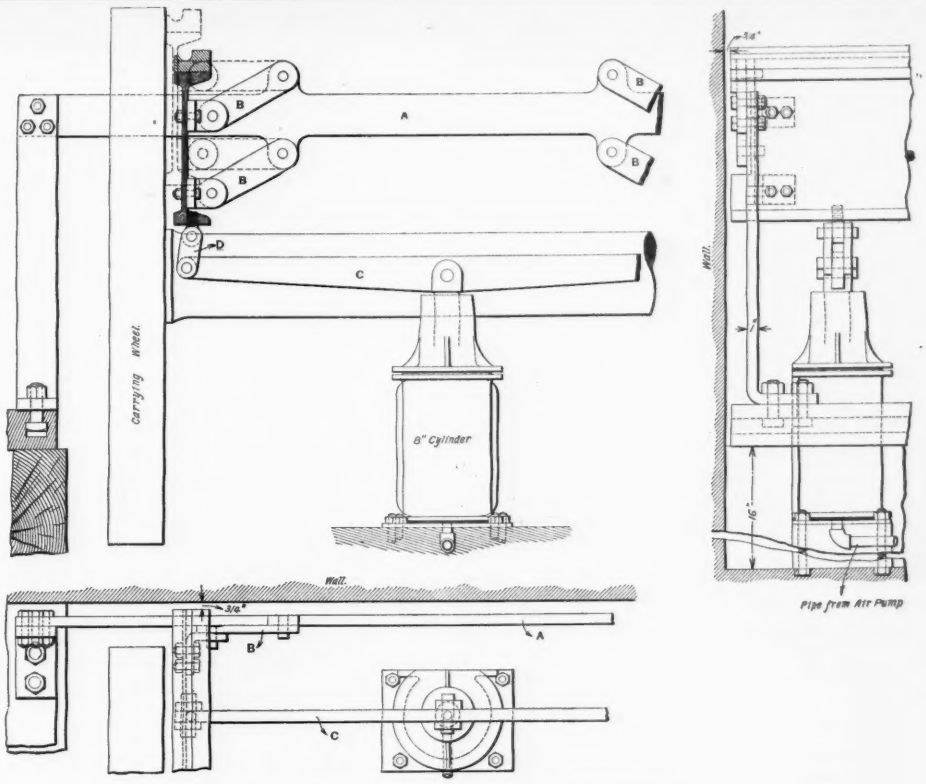
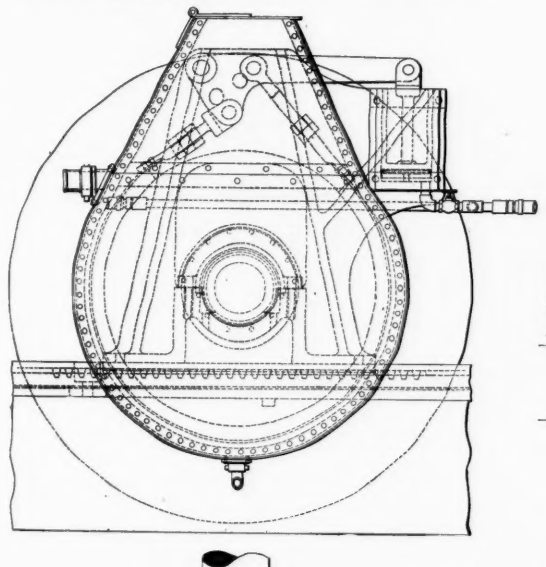


Fig. 4.—Removable Track—C. & N. W. Testing Plant.

New Interlocking Machine of the National.

The National Switch & Signal Company has recently completed a 64-lever interlocking machine which shows the latest practice of this company and which is in several respects an improvement on anything that the company has done before. This machine was built for the New York, New Haven & Hartford to be installed at Hartford, Conn. It contains 28 signal levers, 13 switch levers, 15 facing point lock levers and two levers for working movable frogs. The remaining levers are spare. There are four sets of slip switches included in the switches operated by the machine.



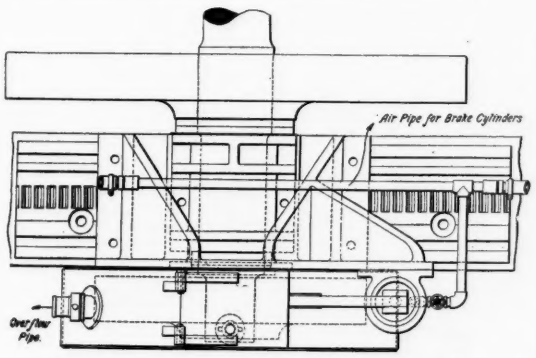
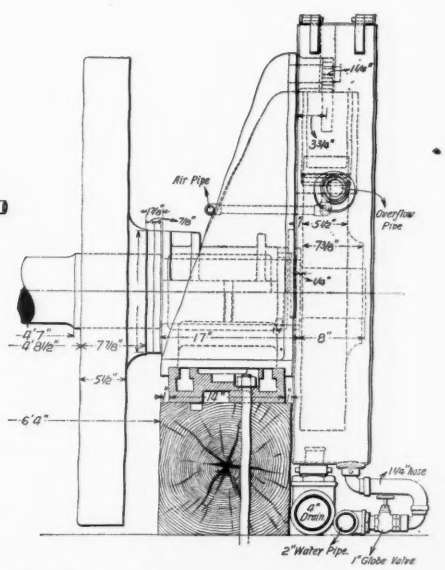


Fig. 3 —Arrangement of Brake Rigging—C. & N. W. Testing Plant.

The machine is of the well known type standard with the National Company; that is, the locking is miter locking and is arranged in vertical planes. The tappets are hung from both ends of rocking link, permitting a very compact arrangement of the machine; with any given machine the depth below the floor can be reduced to considerably less than that which would be required if the locking was done by tappets hung from only one end of the link. Moreover, a better balance is secured, lessening somewhat the work of moving the lever. This arrangement, however, is not new in this machine, having been used by the National Company for some time for its larger machines; but a number of modifications have been made which are undoubted improvements.

One of these is a change in the form of the special lock, a mitered block having been substituted for the small disk which was heretofore used. This arrangement automatically takes up any slack from wear of the special lock, and also gives a large wearing surface. Another change which seems a good one, is the substitution of a pin and case-hardened rolling cylinder for the sliding block which runs in the slot of the rocking link, transmitting the motion from the lever to the tappets. This must reduce friction and avoids the possibility of jamming which might have taken place from the cocking of the sliding block after it became worn. We do not know that this has ever been a noticeable defect in the National machine; probably it has not been; but, at any rate, the possibility disappears with the new arrangement. Moreover, the small cylinder can be replaced with five minutes' work, and at a cost of a few cents if it should become worn. This leads us to mention another one of the excellent points in the arrangement of the locking in this machine. The locking dogs are all placed outside the sliding bars; thus any change in the locking can be made with great readiness.



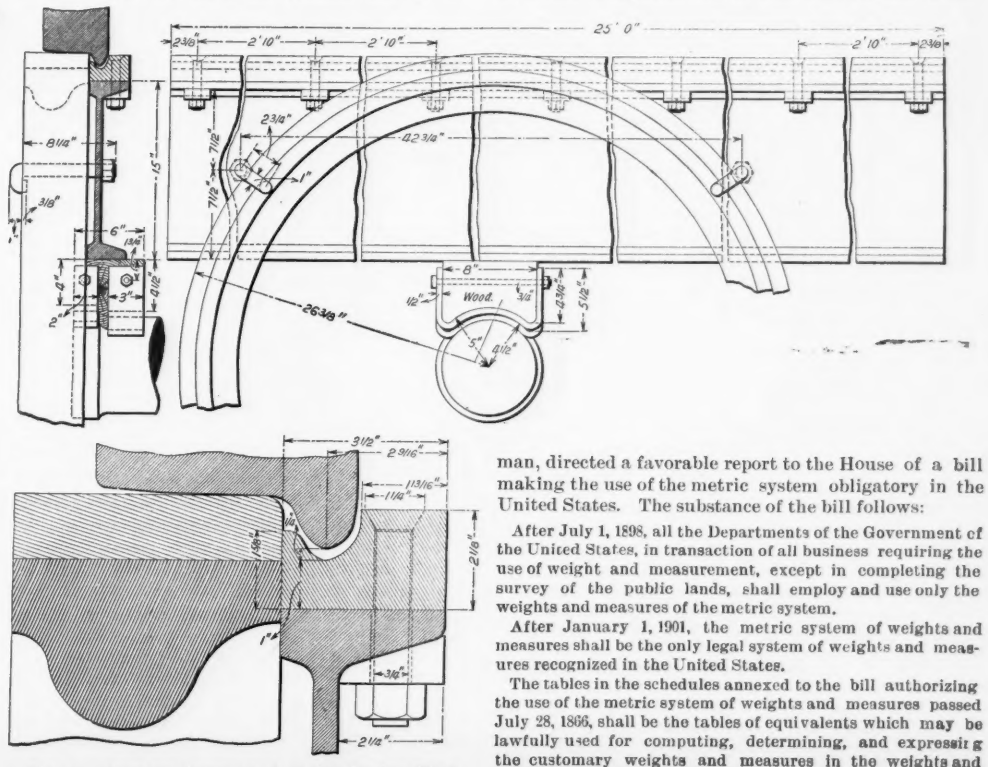


Fig. 5.—Carrying Beam, C. & N. W. Testing Plant.

Another improvement in the new machine is the machining of the faces of the hubs of the lever shoes and the spacers on the main shaft. These are now arranged with a close fit and carefully machined. Many of the parts of the new machine are made heavier than in former standard practice. The diameter of the main shaft has been increased and the frames are heavier. Moreover, positive stops have been put in to determine accurately the stroke of the levers. The workmanship all the way through strikes us as being especially good. The rubbing surfaces of the rockers, of the quadrants on the bed plate, and of the plates carrying the locking bars are all milled carefully, special tools having been designed and built for this work. The castings are all made in the foundry of the National Company from a special mixture and are excellent work. The malleable castings are supplied by Messrs. Pratt & Letchworth. A minor innovation introduced in this machine is the nickel plating of the handles on the levers. These parts are coppered and heavily nickled. This strikes us as an improvement of doubtful advantage, and we question if it will be retained as standard practice. On the whole this machine is worth careful examination by anyone interested in such work.

The Metric System.

The Committee on Coinage, Weights and Measures, of the House of Representatives, Hon. C. W. Stone, Chairman, directed a favorable report to the House of a bill making the use of the metric system obligatory in the United States. The substance of the bill follows:

After July 1, 1898, all the Departments of the Government of the United States, in transaction of all business requiring the use of weight and measurement, except in completing the survey of the public lands, shall employ and use only the weights and measures of the metric system.

After January 1, 1901, the metric system of weights and measures shall be the only legal system of weights and measures recognized in the United States.

The tables in the schedules annexed to the bill authorizing the use of the metric system of weights and measures passed July 28, 1866, shall be the tables of equivalents which may be lawfully used for computing, determining, and expressing the customary weights and measures in the weights and measures of the metric system.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Several hearings on the Nicaragua Canal matter have been held by a sub-committee of the House Committee on Foreign Affairs. Mr. Warner Miller, President of the Canal Construction Company, is the most important of those who have been heard so far. Mr. Menocal's appearance has been delayed by illness. We are told that the chairman of the sub-committee does not intend that the members of the Engineer Board which recently made a most thorough, able and carefully studied report on the enterprise, shall be heard. This is almost incredible. We have repeatedly called attention to the fact that there is an evident disposition to conceal as far as it can be done the findings of the Board. This appears in the careful restriction of the number of copies of the report printed and in the failure to print any of the valuable appendixes. But we can hardly imagine that the committee can be so indifferent to public interest and public rights as to decline to let the members of the Board reply to Mr. Miller's sophistical testimony. Who is to be harmed by finding out the truth and giving it the greatest publicity? Is Mr. Miller afraid to meet the Board in public? Is he afraid to have all the facts known to the American public? Or are the members of the committee afraid that their judgment will be warped by hearing both sides? The Board has shown, as no investigation ever showed before, the immense possibilities of disaster and disgrace in this enterprise. No one who is responsible for the action of the nation in the matter can afford to proceed without the fullest knowledge. The responsible members of Congress owe it to their own reputations to move with great care and in the full light of day.

The full text of the Supreme Court decision in the Social Circle case throws but little additional light on the questions dealt with. We give the salient points in another column. The chief one is that the Georgia Railroad "having elected to enter into the carriage of interstate freight and thus subjected itself to the control of the commission, it would not be competent for the company to limit that control in respect to foreign traffic to certain points on its road and to exclude other points." Judge Shiras says that the company "*thereby* makes its road a part of a through line." The natural inference from this is that, as regards the fourth section of the Interstate Commerce law, every part of such a line, long or short, is to be treated the same as any other part. According to Judge Brewer's decision in 1892 (*Railroad Gazette* Oct. 28, 1892, p. 811) it would be lawful for the Georgia Railroad to charge 30 cents on carriages from Atlanta to Social Circle, while charging only 29 cents from Cincinnati to Social Circle, provided the 30-cent rate were not unreasonably high in itself; while at the same time a rate of 30 cents to Social Circle from a point 10 miles north of Atlanta would be an infraction of the law. Thus while the Supreme Court steers clear of the precise points covered by the 1892 decision, it is quite safe to say that no lower court would now, in the light of Judge Shiras' decision, utter an opinion like that which was then given. The long-and-short-haul law is now well settled, and a railroad desiring to disregard the principle must be prepared to show that the public good—the greatest good of the greatest number—will be promoted by the suspension of the act (as provided in its terms). The denial of the right of the Interstate Commerce Commission to fix rates where no complaint has been made, or where if made, it has not been fully argued, is a salutary restriction and cannot possibly deprive any one of any material right. The Commissioners will have no trouble whatever in finding a complainant whenever they discover anything that really needs to be complained of, and the right to *adjust* rates, as compared one with another, which they now possess, can readily be made to include the "making" of rates wherever the public good requires it. The real trouble in this case was that the Commissioners too readily assumed that the low rate to Birmingham was a fair rate; that any rate, howsoever low, made by a railroad without legal compulson, is a reasonable rate. This is a vicious theory which the Commissioners have espoused in decisions more than once. The reply of the railroads that in a rate war they are compelled in self-defense to carry goods at less than the cost of the service has been brushed aside with ill-concealed contempt; and while no important decisions, so far as we recollect, have been based entirely on that ground, it was clear that the Commission cherished the argument as an appropriate "club" with which to overawe the roads.

We assume that the reader is familiar with the terms of the Interstate Commerce law. If he is not he should get a copy from the Secretary of the Commission. The decision reported in the paragraph below, as well as that referred to above, may be understood much better by a reference to the quotations from the law which are embraced in them, but we have not the space to reprint such long extracts. An interesting point in the Social Circle decision is that touching upon the duty of railroads to present their cases in good faith to the Interstate Commerce Commission. Some people think that the courts are uniformly jealous of all possible usurpers of their functions, and that therefore every judicial decision "sits down upon" the Commission as severely as possible. There is nothing in the present decision to seriously impugn that theory, but, on the other hand, there is little to support it. The Act to Regulate Commerce certainly is upheld with vigor, and the admonition to the railroads to stop fooling away time by either willfully or carelessly withholding evidence from the Commission plainly indicates approval of the Commission in its legitimate function of an "administrative board." That function, abstractly considered, is a highly valuable one. It is twofold: (1) to investigate and give publicity to railroad matters which ought be known, but which do not come before the courts, and which might, if no Commission existed, never come before the public except by the clumsy and generally ineffective if not absolutely harmful means of a legislative bill, conceived in ignorance; and (2) to act as an aid to the courts by sifting the great multitude of complaints which must inevitably arise in so complex a business as transportation, and convincing the complainants in the weak or trivial cases that they had better withdraw them. It was this advisory function and the expected benefit from it that led conservative men to favor the establishment of the Commission.

This matter of the general function of the Commission, looked at in a broad way, is the subject of one of the most important paragraphs in the other Supreme Court decision that we publish to-day, that on the Import Rate case. That decision, even as abbreviated in our columns, is rather long, but it deals with fundamental principles and merits a careful perusal. In making decisions which may seriously affect, favorably or unfavorably, not only the railroads, the shippers and the consignees of many cities, but thousands of consumers throughout the whole of one or several States, the Interstate Commerce Commission is undertaking a grave responsibility, and the characterization by the Supreme Court of such a proceeding as a practical usurpation of the law-making power of Congress must tend to produce a sobering effect on any Commissioner disposed to yield to the clamor of shippers, granger or other, who demand that the Commission "rule the railroads with the strong hand of the law," as they like to phrase it. This deliverance of the Supreme Court only voices and gives effect to a feeling, long entertained by careful observers, that one of the gravest dangers connected with the interstate law is the liability that the Commissioners, with an undefined field, and under strong pressure from powerful interests, may undertake the impossible task of curing all the evils of the traffic world. Even Judge Cooley, the first Chairman of the Commision, and a conservative and level-headed railroad expert, was believed by many of his friends to have been hampered by this mistaken view of his duty to the public. The Commission is set to adjust an existing law to actual business conditions, and the task is so difficult that there is a constant temptation to amend the law by reading into it things that are not there, thus mixing up the two functions of administration and law-making. It is, indeed, hard to decide where to draw the line between the two functions, especially where the law, as in the case of the Interstate Commerce Act, expressly gives to the administrative body such large discretion; but Judge Shiras suggests a very effective rule, albeit a simple and homely one: When you find yourself unable to get at facts which are clearly necessary to a just decision, and find yourself obliged to fall back upon conjecture, give up the job! It is a wise general that knows when to retreat.

THE Texas & Pacific decision is undoubtedly in favor of the greatest number of people interested, but the merchants on the Atlantic seaboard are by no means so small as not to be heard. Congressmen already propose to pass a law reversing the Supreme Court's decision. The argument of the New York shippers is thus set forth by the Journal of Commerce:

> The Court sets aside the order of the Commission and sustains the company, and in doing so establishes a rule of law which may have far-reaching consequences. That to send American cutlery from New Orleans to San Francisco should cost four times as much as to transport English cutlery shipped at Liverpool over the same distance may not count for an appreciable sum on the price of a pocket-knife, but it is nevertheless a tangible advantage in favor of the foreign shipper. The argument that he would have it whether the American railroad gave it to him or not does not fully meet the case. The railroad greatly shortens the time of transit, and to that extent reduces the cost of doing business. For the lighter and costlier kinds of merchandise it must always have the advantage over the ocean carrier, and may therefore fairly charge a higher rate. Suppose that the American manufacturer should have to meet the competition which some people apprehend in the near future from China and Japan; it will be possible under this decision to establish rates from San Francisco to New York on Asiatic products competing directly with our own, lower than the rates charged on similar freight from St. Louis to New York. While not denying to Tokio or Hong Kong the right to enjoy all the advantages that nature has given them, the American merchant and manufacturer may fairly object to the use of the railways of their own country to increase these advantages to their detriment.

Yes, the railroad ought to charge more than is asked on freight sent from Liverpool to San Francisco by way of Panama, for the New Orleans route is shorter and quicker, or ought to be. But how much more? Probably we shall find the justifiable difference very small, and the New Yorkers will be as bad off as before. The chief argument presented by Judge Shiras still remains. It applies also to the New York consumer who may prefer to buy in Tokio rather than in St. Louis if he can save money by it. But we did not set out to discuss Protection vs. Free Trade.

The Norfolk & Western Reorganization.

Reorganization plans have been thick the last few months. In fact all the great insolvent systems are now in the immediate process of reconstruction except the Union Pacific and the Baltimore & Ohio, which has only just gone under.

The Norfolk & Western Railroad went into receivers' hands only a year ago, and now the reorganization has issued and is considered a success. Three or four different causes have united to make a rather rapid recovery possible in the case of this road. There was not the great array of different bondholders' committees to be forced into harmony; nor is the property complicated by an intricate mass of securities and a great body of leased lines, as was the case with the Northern Pacific and the Atchison. The problem of reorganization has been a comparatively simple one in this case, and the language of the published plan is correspondingly simple and straightforward.

The Norfolk & Western is of course primarily a coal carrier, and therefore compelled to do the bulk of its business at very low rates and to look to large increase in the volume of traffic for any profits. With this condition in view the past management of the road went heavily into the business of building extensions to act as feeders, and unfortunately the coming of hard times checked the natural development of these branches at just the wrong moment. Added to this a lot of heavy car trust obligations were necessarily incurred by the company in order to meet the increasing volume of coal traffic, and these two burdens together eventually forced the road

under. It was a peculiarly unfortunate case, for the company managed to keep its head above water until just the hour when the industrial situation took a decided turn for the better. The earnings of the road have kept up well for the last five years, but the mileage of the road has increased from 826 miles in 1890 to 1,570 miles in 1895. The net earnings of last year, in the face of the long coal strike, were $2,395,000; while the highest figure ever reached was $3,334,920 in 1891.

In order to bring fixed charges down to a practical working basis the usual plan is adopted The existing high.interest bearing securities are replaced in part by a lower-interest bearing bond representing actual investment value, and in part by preferred stock representing that portion of the value which is really only speculative.

Three classes of securities are to constitute the financial capital of the reorganized company; $62,500,000 first consolidated mortgage bonds carrying 4 per cent. interest, $23,000,000 four per cent. preferred stock, and $66,000,000 common stock. The old underlying liens on the property are not to be disturbed, $25,986,889 of the new 4s are reserved to take their place; $9,690,436 of the new 4s are to go for new equipment and improvements and $3,500,000 are reserved for certain contingencies of reorganization. This leaves a balance of $23,322,675 of the new first mortgage which with the new preferred stock is applied to exchange with the old securities that are to be disturbed on the basis of the following table:

DISTURBED SECURITIES.	To receive in— Cash P. C.	1st Con. M. B'nds. P. C.	Prf'd St'ck. P. C	Com. St'ck P. C.
Adjustment mort. 7 per cent. bonds	7	130	20	.....
100-year mort. bonds	.....	62½	75	.....
Maryland & Washington Div. bonds	.....	70	67½	.....
Clinch Valley Div. bonds	.....	50	70	.....
Equipment mort. bonds of '88.	.....	100	48	.....
Five p. c. debentures of 1892	.....	....	100	.....
Roanoke & Southern Ry. Co. Bonds	.....	55	65	.....
Lynchb'rg & Durham RR. Co	.....	55	65	.....
N. & W. R.R. Co. common stock	On pay'nt of $12.50 per share dep'sited.	....	....	75
N. & W. R.R. Co. preferred stock		....	....	112½
Roanoke & Southern Ry. Co. stock		....	....	75
Lynchburg & Durham R.R. Co. stock		....	....	75

The immediate cash requirements are expected to reach the amount of about $7,437,500 which covers the following items: Floating debt including receivers' certificates, $1,825,000; accrued interest on the undisturbed mortgages, $605,000; car trusts to be paid off, $3,125,000, and a balance of $1,882,500, which amply covers the immediate requirements of new equipment and all the expenses of reorganization

With the new capitalization fixed charges will be reduced to a very endurable figure. The present fixed charges have reached the figure of $3,214,037 and even this does not include the interest on the floating debt or any of the rentals paid by the company. Under the new company the fixed charges will be $2,230,444, which is well under the average net earnings of the last five years, which have been $2,853,200, and is even below the earnings of 1895. In fact the fixed charges which will be ahead of the new common stock are less than those which come before the present preferred stock.

The assessments of $12.50 on both preferred and common stock will cover the cash requirements, and are certainly heavy enough to put this reorganization plan in the same class with the recent plans dealing with other railroad properties which have so uniformly borne heavily on the stock. As we have repeatedly remarked in these columns, this is only putting the burden where it justly belongs. In the present case no dismemberment of the Norfolk & Western system is contemplated and the Lynchburg & Durham, and Roanoke & Southern railroads are retained as integral parts. After a study of the plan it is clear that the outlook for the new company is excellent, and that with the old car trusts wiped out and fixed charges reduced nearly a million dollars, the revival of business will continually bring back not merely solvency but prosperity.

The Canadian Pacific Report.

The annual report of the Canadian Pacific Railroad for the year ending last December was made by President Van Horne to the stockholders at their meeting on the first of this month. It shows improved conditions in all departments, and indicates that the situation which led to the passing of the dividend on the common stock in April of last year need not be expected to recur in the immediate future. The fears which were aroused by this action of the directors a year ago were in the main quieted before the year was over, but the figures of the present report may be counted on to put an end to this earlier feeling of apprehension, and to recommend the conservative policy which the management pursued. Bad industrial conditions which extended over the years 1883 and 1894 showed their effect on the earnings of the railroad until about May or June of 1895, but from that time earnings have increased steadily and in large measure, and reflect a much improved business and agricultural situation. In addition to this, the report announces that an unusual proportion of last fall's harvest remains over to be moved this season, thus promising well for the earnings of the first half of 1896.

A brief abstract of the year's balance sheet shows the following results:

Gross earnings:		
Passenger traffic	$4,683,138	
Freight "	11,877,552	
Miscellaneous	2,380,047	
Total gross earn		$18,911,057
Working expenses		11,460,086
		$7,480,951
Other income:		
Interest on securities held	$112,246	
Received from subsidiary lines	440,667	
Total		$ 52,913
Total net inc		$8,033,864
Deduct fixed charges	$6,659,478	
" dividends	1,231,960	
Total		$7,891,438
Surplus		$142,426

The dividends declared during the year have been 4 per cent on the preference and 1½ per cent. on the common stock. Among the causes which enable the road to show a surplus this year we must note particularly the following: The considerable increase in freight traffic, the reduction of the amount charged off for dividends from $1,881,960 in 1894 to $1,231,960 in 1895, and the better showing made by the two subsidiary lines which the Canadian Pacific controls in the United States. Of these last mentioned companies the Minneapolis, St. Paul & Sault Ste. Marie paid all its fixed charges, but the Duluth, South Shore & Atlantic lost heavily on account of the long strike in the iron mines along Lake Superior, and had to be helped out by the Canadian Pacific to the extent of $148,717. The line of Pacific steamers has also proved a source of considerable profit to the company in 1895. A comparison of the earnings of the whole system for the last few years indicates very well the experience through which the road has passed, and the present turn for the better.

	1895.	1894.	1893.	1892.
Earn....	$18,941,037	$18,752,167	$20,964,317	$21,409,351
Exp.....	11,460,085	12,328,859	13 220,901	12,989,004
N. earn.	$7,480,952	$6,423,308	$7,741,416	$8,420,347
Surplus after deducting fixed charges and dividends...	$142,426	Def. $2,403,692	Sur. $337,682	Sur. $2,221 932

Operating expenses were 60.5 per cent. of earnings, as compared with 65.75 per cent. in 1894. The average freight train hauled consisted of 16 cars, as against 14 cars in 1890.

The policy of replacing wooden bridges by permanent iron or masonry structures or embankments has been pushed, 287 of these having been replaced this year, and it is estimated that four years will complete this work, the expenditure for 1896 to be about $600,000.

The comparative figures for passenger and freight traffic are as follows:

	1895.	1894.	1893.	189'.
Pass. earn	$4,683.138	$4,840.412	$,656,205	$5,556,316
Freight earn.	11,877,851	11,445,578	12,673 075	13,330,540

This summary does not show much increase over last year, but there is enough expansion to give considerable encouragement when coupled with the fact that the figures for January and February, 1896, record a gain of $636,985 in earnings over the same months in 1895. As usual, the average earning on freight has fallen a little in the year, having been 0.80 cents per ton miles in 1895, as against 0.87 cents in 1894.

Some changes have taken place in the capital of the company in the past year; £220,550 of four per cent. consolidated debenture stock was issued, of which £116,550 went for improvements and £104,000 for the acquisition of bonds of subsidiary lines. No improvement has been apparent in the department of land sales, only $199,280 having been realized in 1895, and not much can be expected from this source of revenue for a year or two. An extension of the Montreal & Ottawa Railway for a distance of 41 miles to Ottawa itself is the only piece of new construction which is urged by the present report, and but half of this is proposed to be built in the year of 1896. The company will be called on to expend $300,000 in 1896 for air-brakes and automatic couplers, this to be charged to capital account- A further capital expenditure of $641,000 will be made in the year on freight equipment and terminals.

Railroads in Chili.

The Eleventh Annual Report of the Director General of the State Railroads in Chili, corresponding to the year 1894, has just been issued. It gives in detail the results of operation on all the lines open to traffic, with, however, some rather curious omissions. Among these may be mentioned the failure to state the length of any of the roads constituting the system. The Report does state, however, that from 1892 to the end of 1894 there were opened to traffic four new branches, viz., from Santiago to Melipilla, from Peléquen to Peumo, from Palmillo to Alcones and from Victoria to Temuco, and from the "Sinopsis Estadistica y Geográfica de la Republica de Chile," of 1892, it appears that these branches, then in construction, aggregate 123 miles in length. The total length of the state railroads in operation at that date was 686 miles, hence the Republic is administering to-day 809 miles of railroad. In addition to this there are upward of 400 miles in construction or under survey not specifically mentioned in the report.

The gross income for 1894, stated in Chilian currency, which owing to fluctuations in exchange* is difficult to convert, amounted to $12,691,267. The expenses being $11,682,483, the net result was $1,008,784, equivalent to 1.67 per cent. on the estimated capital invested in the state railroad system.

The returns from passenger transportation were as follows:

	Passengers carried.	Receipts.
First class	1.056.477	$1,795,106
Second class	816,127	863,271
Third class	3,456 965	1,557,204
Totals, 1894	5,331,569	$4,215,581
Totals, 1893	4,667.802	4.607,351
Gain in 1894	663.767	$108,230

The total freight moved in 1894 amounted to 2,022,766 tons, being a gain of 11,656 tons over 1893, and yielding a gross revenue of $7,307,091. There was a reduction of income, however, due to an excess of shipments of lower class freight, and to large shipments of sleepers, rails and materials of construction for the use of the railroads. Further reduction of revenue occurred from alterations in the schedule of classification, which have been made in response to a popular demand that the railroads should merely cover costs, and cease to be a source of revenue to the state. To this end, staples such as wheat, flour, etc., have been reduced from second to third class, and wines, beer, etc., from first to second class. The anticipated reduction of net receipts has followed, but it has provided a new bone of contention, since the practical effect has been to carry these staples at less than the actual cost of transportation, which deficit has been covered by the profits from the carriage of luxuries, a condition which is viewed with displeasure in certain quarters. The Director General recommends reforms in the handling of baggage which would tend also to augment the receipts from passenger traffic, and thus help to cover deficits from the transport of staples. The peculiar conditions now prevalent are strikingly revealed by these suggested reforms, which are: 1st, to increase the passenger rates so as to cover baggage charges; 2d, to limit the weight of baggage which each passenger may carry in the same train in which he travels; 3d, to establish a baggage service in special cars on freight trains; and 4th, to abolish the carriage of animals on passenger trains as part of the passengers' baggage.

The question of tariffs seems to be the most serious with which the management of the Chilian railroads has to deal. The demand for more cars and cheaper rates led about two years or more ago to the enactment of a law whereby individuals might maintain their own cars, a reduction of 25 per cent. from regular rates being allowed to those shipping in private cars; but the result had evidently not been felt at the time of preparation of this report, for the Director General dwells at length upon the extreme scarcity of rolling stock, with a constantly increasing production in the country, and an increase in railroad mileage without proportionate additions to the equipment. The inventory of rolling stock belonging to the government roads is:

	1893.	1894.	Inc.
Locomotives	265	275	10
Passenger and baggage cars	290	301	11
Freight cars	3,677	3,357	-80

With 3,932 freight cars in service during the year 1894, the total car mileage was 48,999,982, the proportion of "empties" run being 21 47 per cent. The passenger car mileage, with 248 cars in service, was 9.445,322 A total of 146 trains in operation, distributed as follows: 54 passenger, 26 mixed, 51 freight and 15 special; made 48,596 trips during the year. The average distance run by each locomotive was 33,472 miles, being an increase of 1,520 miles per locomotive over the average duty during 1893, and five locomotives each exceeded an annual duty of 55,800 miles.

The rolling stock up to 1894 had been almost exclusively obtained abroad, the purchases being nearly equally divided between the United States and England, as appears below:

	American.	English.
Locomotives, passenger	32	29
" freight	71	51
" switching	16	16
Cars, passenger	165	136
" freight	1,950	2,067

An experiment in building locomotives in Chili proved unsatisfactory. No single firm was found able to build an engine complete, so that contracts for separate parts were awarded, which led to many delays and difficulties. Contracts have, however, been awarded to native manufacturers, allowing ample time for completion, and it is hoped that in future no further orders for locomotives will need to be placed abroad. Chilian car builders are already supplying the demand of the government roads satisfactorily.

Extensive improvements are being made throughout the system, especially on the middle section. During the year under review 61,233 yards of new steel rails were laid, and it is intended to replace the old iron rails as fast as possible with steel. In addition, 214,482 ties were renewed, and 700,856 cubic yards of ballast was put in, besides repairs to bridges, and construction of many new stations and freight sheds. The Director General urges that the lines be fenced throughout, that grade

*Exchange fell as low as 21 cents in 1894.

crossings be abolished, that plants be erected for creosoting ties, and that all rolling stock be equipped with automatic brakes.

Another important recommendation is that the Chilian coal mining companies be required to adopt means of cleansing the coal furnished to the government railroads. It is estimated that at present fully 30 per cent. of the coal used in the locomotives is as fine as or finer than "slack." By instituting modern processes for coal washing, and making up the "fines" in the form of briquettes, it is claimed that the whole output could be delivered in a form acceptable for locomotive work.

The number of accidents has been reduced, though it is still large. The record for 1894 was 168 derailments and 120 collisions, the former being caused chiefly by stray cattle. The number of collisions has been lessened by an improvement of the telegraph service, chiefly through an increase in wages of operators, thus permitting better men to be selected, and by instituting promation for merit. Telegraphic schools have also been opened in Santiago and Concepcion.

Since the publication of the above mentioned report the Chilian Congress has enacted a new railroad law, which permits persons desiring to construct a railroad to obtain legal privileges by appeal to the ordinary courts, after public notice of the petition has been given for 15 days. If this petition is granted the corporation acquires the customary rights and privileges of a railroad company, including the gratuitous use of public lands for right of way. Such roads are to be common carriers, their tariffs are to be subject to the approval of the government, they are prohibited from running along public roads, and no level crossings at highways are permitted. It will thus be seen that while the purpose of the new law is not to encourage the introduction of the Baroda Railways system into Chili (a system which has become so popular in São Paulo, Brazil, and which is being so vehemently urged as an adjunct to the standard gage railroads in the province of Buenos Ayres, Argentina), it is, nevertheless, the plain intent of the act, by removing legislative embarrassments from the organization of new corporations, and by allowing large license in the requirements for permanent way, to increase the number of light railroads, for the benefit of the rural population.

Another notable railroad law, passed by Congress in February, 1895, authorized a government guaranty of 4½ per cent. on a capital of $7,500,000 for the completion of Clark's Trans-Andine Railroad. The Supreme Court of Chile has also decided that the monopoly of railroad transportation in Tarapacá, claimed by the powerful Nitrate Railways Co., Limited, is not valid, and in consequence three new lines are about to be built in that province.

Efforts to end the coal rate and passenger rate troubles between Colorado roads were made last week. Attorneys for the Denver & Rio Grande filed a petition with the United States District Court, asking the court to compel Receiver Trumbull, of the Union Pacific, Denver & Gulf, to comply with the terms of the contract for the use of joint track between Pueblo and Walsenburg, it being held that the action of the Receiver in reducing passenger rates was a violation of the terms of that contract. The petition recites the cause of trouble to be the contest between the Gulf and the Atchison over coal rates, and alleges that in the attack upon passenger rates the Rio Grande is wrongfully dragged into the matter and made to suffer loss in passenger earnings. The petition further states that the Rio Grande has used its good offices to heal the breach between the two companies. The reply of the Receiver was that the Rio Grande was secretly in sympathy with the Atchison in the coal rate trouble, and that these roads aimed to destroy the principal source of revenue of the Gulf road. Receiver Trumbull insists that his coal trade from the lignite field north of Denver shall be protected from the competition of better coals shipped into the Denver market from the South at unreasonably low rates. The southern coals are hauled a distance of about 175 miles to Denver while the lignite field is but 40 miles distant. It is alleged upon good authority that the Gulf is preparing to make a trackage agreement with the Colorado Midland by which the latter will use the track of the Gulf between Denver and Colorado Springs, instead of the Atchison line as at present, and that this coal rate war was started in the nature of a threat to prevent such change. As we go to press it is reported that representatives of all the roads have met in Chicago and come to an agreement to restore rates.

The New York agent of the Cleveland Steel Canal Boat Company tells a reporter that his company expects to at once increase its fleet of boats, running between Cleveland and New York City, to 15 steel barges and four steamers. Three steamers and 10 consorts are now building at Elizabeth, N. J., and they are expected to be ready for service by May 1. These steamers are 220 H. P., more than twice as large as those which were run last season. It is expected that each steamer will push two barges and tow one. There has been no difficulty in getting marine insurance on these vessels at favorable rates. The agent, Mr. Oxley, thinks that the vessels will readily get grain for their eastbound cargoes, the line competing chiefly with vessels which heretofore have taken grain from Lake Erie ports to Montreal.

"A Routing Outrage" is the term used by *The Timberman* to describe the way it feels about the action of the Northern Pacific in withdrawing through rates on shingles from Washington and Oregon to Iowa and Illinois via Billings. A long article is printed going to show that the road compels shippers to send their shingles via St. Paul whether they desire to send that way or not. We have no doubt that all the lumber dealers interested know the facts (which are, we presume, that shingles may be shipped via Billings and over the Burlington line from there, at a fair rate, but that if a very low rate is wanted, the Northern Pacific favors itself instead of the Burlington); but we wish merely to offer a mild protest against that title. Why should the Northern Pacific favor its competitor? Does not a lumberman deem it legitimate business to sell goods at prices enough below his neighbor to get a fair share of the trade? The *Timberman* presents one argument, however, that the Northern Pacific will do well to heed, if it is well founded. The editor learns from a manufacturer that the Burlington, which has had an arrangement with the Northern Pacific for some time, for through billing via Billings, has been more prompt in supplying cars, and has furnished larger ones. It is also claimed that the time of transit is less than via St. Paul. Facilities count as well as rates. The public knows a good thing when it sees it, and will have the best service sooner or later. If the English law prevailed in this country, the shingle shippers could apply for an order compelling equal rates over the Burlington; and perhaps they might get it.

NEW PUBLICATIONS.

The Water Supply of Cincinnati. A Report to the Honorable Board of Administration on the Extension and betterment of the City Water Works. By the Engineer Commission. Cincinnati, March 20, 1896.

Last December a Board of Engineers was appointed to investigate the question of the extension and betterment of the water works of the city of Cincinnati. This Board consisted of Messrs. John W. Hill and Samuel Whinnery, of Cincinnati, and George H. Benzenberg, of Milwaukee. The report of the Commission is now before us. It is estimated that, looking ahead forty years, provision must be made for a population of 646,000, of which 550,000 must be supplied by the city works. The other 100,000 may be expected to be supplied by water works existing now in the suburban villages that are to be annexed. It is assumed also that the daily consumption will be 130 gallons for each citizen, which gives 71,500,000 gallons a day as the average with an occasional maximum of 107,000,000 gallons. In seeking for the source of this supply the Commission has considered many different propositions. One of these is to impound water on the Cumberland plateau in Kentucky. This involves a conduit 130 miles long at a total estimated cost of about $27,000,000 and the further complication that the source of supply will be in a foreign state. Another project before the Commission was that of bringing the water from Lake Erie, which seems to be a favorite one with various people. This involves bringing the water 250 miles. A conduit of sufficient size would cost $40,000,000 The water would have to be pumped over a ridge 378 ft. above the level of the lake, which is 140 ft. higher than water is now lifted from the Ohio River to the supply reservoir of the city. In fact the mean lake level is 103 ft. below the water level in the Eden Park (Cincinnati) reservoir. Another project is to procure the supply from ground water by wells, and this would be worth careful study if a better project did not offer itself. This better project in the estimation of the Commission is to take the water from the Ohio River, the present source; but the Ohio River supply now is very bad inasmuch as it is more or less diluted sewage from the valley from Pittsburgh down. The plan proposed by the Commission is to filter and purify the water taken from the Ohio. It is believed that this plan can be carried out at a total cost of about 6½ million dollars. The project is developed in the report at considerable length, and drawings are submitted showing pumping stations, reservoirs and filters, pumping machinery, etc.

The Coal Trade. By F. E. Saward, editor of the *Coal Trade Journal.* New York, 1896.

This is the twenty-third annual issue of this publication, which has long been an accepted authority in its special field. It contains such a great variety of information regarding coal production and shipments in this country as to make it indispensable to anyone having need to be posted on the coal trade. The statistics of foreign production are less complete and satisfactory, and the usefulness of much of the miscellaneous matter would be improved by a more careful and rational arrangement. The book contains 125 pages, opening with a review of the trade conditions in 1895, which takes up five pages. Several pages of general statistics follow, and the main portion of the book is given up to a report of the coal trade by states.

The shipments of anthracite coal from the mines in 1895 are given as 46,545,670 tons, over five million tons more than in 1894. The production of bituminous coal is estimated at 128 million tons, Pennsylvania being well in the lead with 45 million tons produced, as compared with 18 million tons reported by Illinois, the state next in rank. The coal production of Ohio fell from 14,800,000 tons in 1893 to 11,900,000 tons in 1894, on account of the widespread strikes of that year, and it has not regained its lost position, mining only 13,500,000 in 1895.

Niagara Falls in Miniature is the title of a little book recently sent out by Mr. O. W. Ruggles, General Passenger and Ticket Agent of the Michigan Central R.R. It contains illustrations of different points of interest, with quotations from various authors on the pages facing the illustrations. These quotations, selected from Anthony Trollope, Sir Edwin Arnold, Nathaniel Hawthorne, William Black, Bayard Taylor and others, describe Niagara Falls, and give this book a value above those ordinarily issued for advertising purpose. The book closes with a map of the Falls and the Michigan Central lines in the vicinity, together with a few suggestions as to the best ways and means of seeing the interesting places, and a list of hotels. It can be had on application to Mr. Ruggles.

TRADE CATALOGUES.

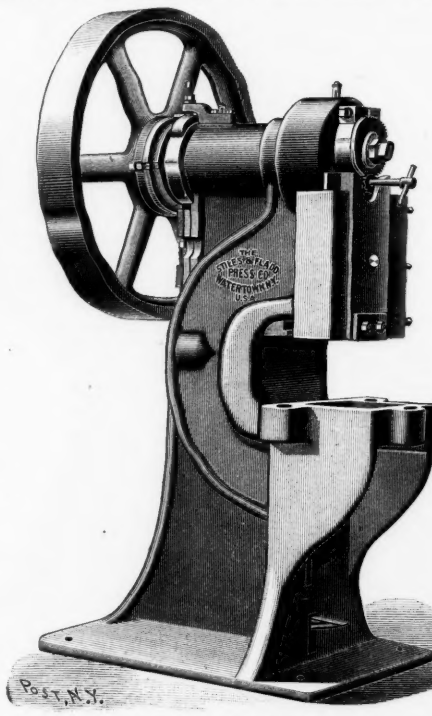
Safety Valves, Steam Gages, Etc.—The Ashton Valve Co., 271 Franklin street, Boston, Mass., sends us its 1896 catalogue. The catalogue is the standard M. C. B. size (6 in. × 9 in.), handsomely printed on good paper, and has a detailed alphebetical index. The whole pamphlet is 80 pages. The catalogue shows the Ashton safety valves for various uses, the Ashton steam and pressure gages, steam whistles, indicator rigging, thermometers, pyrometers and other appliances.

Injectors.—The Rue Manufacturing Co., 116 North Ninth street, Philadelphia, has issued a new catalogue for 1896. It is a pamphlet of 12 pages, standard M. C. B. size, and shows the "Little Giant" and other injectors made by the company.

Hose.—The Boston Belting Co., Boston and New York, issues new catalogues of fire hose and of garden hose and attachments.

A New Punching Press.

In the accompanying cut we show a new punching press, which, while it follows in general the design of the well-known Stiles press, embodies some improvements. No great innovation can be made in the design of a punching press, in which a frame is in one solid casting, but the company putting this improved Stiles press on the market makes an especial claim for excellence of workmanship and the selection of each separate kind of material of which the press is constructed. A special



Stiles & Fladd Punching Press.

mixture of iron is used in the castings and every part on which wear occurs is carefully scraped to an exact fit and provides a perfect bearing surface.

The ways of the slide are exceptionally long to resist side thrust. The clutch adopted on this press has been perfected and recently patented by the inventor of the original Stiles clutch and Stiles press and is superior in many ways to that well-known clutch. Amongst the special features we note the ability to run the press in either direction equally well, three points of contact in the wheel causing the clutch to be practically instantaneous, the power vested in the operator to make at will, a whole revolution or only a part as he may desire, which is a valuable feature, thereby preventing accidents to tools and operators. The clutch can be used to back out a punch that may become stuck in the die and it is claimed by the makers to be the best press clutch built.

These presses are made by the Stiles & Fladd Press Co. of Watertown, N. Y., in six sizes, weighing from 500 to 7,500 lbs. as fly presses, and in five sizes ranging in weight from 1,200 lbs. to 8,000 as geared presses. A great variety of modifications and changes can be made to adapt them to special work and tools of any make.

MacPherson's Safety Switch and Frog.

Mr. Duncan MacPherson, Engineer of the Montreal Division of the Canadian Pacific Railway, has invented a switch and frog which leave the main line rails unbroken. The illustrations, which are reproduced from photographs of a switch and frog of this design on the Intercolonial Railway, show so clearly the way in which the device works that little explanation is required.

It will be seen that the switch rails are higher than those of the main line except at the switch point where the former are cut down to the level of the latter. A train going on to the siding is raised by these inclined

MacPherson's Switch Set for Main Line.

rails so that the flanges of the wheels may pass over the main line rails at the switch and frog. This does away with cutting the main line rails at any point.

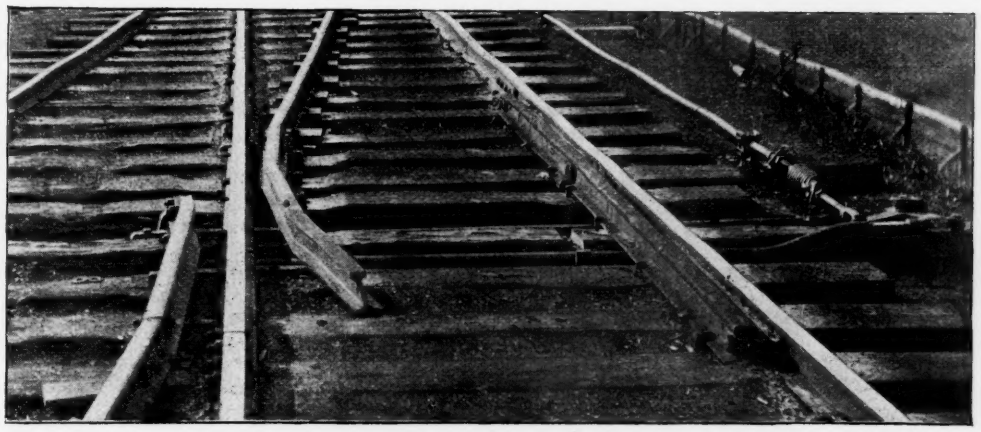
This principle as applied to the switch is not new, as it was applied years ago in the well known Wharton switch, which is still used to some extent. In the Wharton design, however, the rails are cut at the frog, as in the usual forms, while Mr. MacPherson has avoided this altogether.

His switches have been used for some time on the Canadian Pacific and on the Intercolonial railroads where they are giving excellent results as numerous letters from the officials testify.

The frogs consist of two moveable pieces which are connected with the switch lever. This sets both switch and frog at the same time, making the setting no more complicated than in any other case and insuring safety.

The springs of the switch and frog connections, shown in the figures, are adjustable and are locked with a key-pin, which gives a rigid connection for ordinary service. But if a frog or trailing switch is set wrong by mistake, the wheels press against the movable parts, breaking the locking pins, allowing the springs to come into play and letting the train pass without derailing it. In a previous design of Mr. MacPherson's of a frog that has been in use for some time on the Canadian Pacific there was but one moveable part, and safety was obtained, if the frog was set wrong, by an inclined rail on which the wheels would run till the frog was past.

This device can be made as cheaply as any standard pattern and should be durable as only trains going on to sidings touch the switch rails and frogs. It is also adapted to any form of switch stand. Moreover, the rails may creep in either direction without fouling the points. It may be added that the switch may be used with any kind of frog and the frog with any switch, but the best results are obtained by using them together.



MacPherson's Frog Set for Main Line.

The Question of the Big Car.

When we reported recently the discussion at the New York Railroad Club on the matter of large cars, we promised to give in full the contribution to the matter of Mr. A. E. Mitchell, Superintendent of Motive Power, Erie Railroad. Mr. Mitchell's paper follows:

I will present one side of the problem, and endeavor to show how an increase in the length and capacity of box-cars may increase the earnings and reduce the operating expenses, so far as the transportation side of the problem is concerned, but when the additional cost of maintenance of way, etc., is considered, the results may be entirely different.

In my judgment no conclusions can be drawn from this treatment of the subject alone; similar arguments should be brought out on all other phases of the subject and from them all conclusions may be drawn.

The first question which must be considered is that of capacity, *i. e.*, shall we increase our carrying capacity over 60,000-lb., the greatest capacity of box cars now in general service?

As the increase in the capacity of box cars in the past has been gradual, and by increments of 10,000 lbs., it may be assumed that if any increase in capacity is generally adopted, the capacity of such cars will first be 70,000 lbs. and be capable of carrying the usual excess load of 4,000 lbs, and after this capacity of car has been in service a few years the 80,000-lb. capacity car capable of carrying the usual excess load of 4,000 lbs. may be built; hence on this phase of the question I will only consider the 60,000-lb. and 80,000-lb. capacity box cars.

The present 60,000-lb. capacity 34-ft. box cars, when loaded with wheat, will have its lading about 5 ft. 2 in. deep, and with the same cross-section and depth of lading an 80,000-lb. capacity box car must have a length about 45 ft., but with a longer car, the height would probably be slightly increased, hence we will consider our 80,000-lb. capacity car 38 ft. long and its depth of lading 5 ft. 8 in. This car would then be of about the following dimensions:

Inside width, 8 ft. 4 in.
Outside width over sheathing, 9 ft. 2 in.
Inside height under carline, 7 ft. 5 in.
Length over end sills, 38 ft.
Height, top of rail to eaves, 12 ft. 2 in.
Height, top of rail to top of running board, 13 ft.

The 60,000-lb. capacity car being of the following dimensions:

Inside width, 7 ft. 11 in.
Outside width over sheathing, 8 ft. 9 in.
Inside height under carline, 6 ft. 11½ in.
Length over end sills, 34 ft.
Height, top of rail to eaves, 11 ft. 8½ in.
Height, top of rail to top of running board, 12 ft. 4½ in.

You will, therefore, note that a car capable of carrying 80,000 lbs. load is but very little larger than the 60,000-lb. capacity car, and it is safe to say that many roads are building box cars of greater dimensions than the one given.

By the use of the longer and greater capacity car a material loss will result unless the average tonnage per car mile is correspondingly increased, as the extra weight of the car will increase the dead load and the extra length will needlessly lengthen the train. Again, increased storage and switching tracks would be required with the longer and greater capacity cars for the same number of cars. The longer and greater capacity car would cost somewhat more to build and possibly will cost slightly more to maintain than the shorter car.

It is obvious, therefore, that if a longer and greater capacity car is to be substituted for our shorter and lighter 60,000-lb. capacity cars, an increased average tonnage per car must be obtained to effect a saving and increase the net earnings per carload. On nearly all roads the majority of the tonnage is in one direction and cars must necessarily move in the opposite direction either empty or with a comparatively light load. If we increase the average tonnage per car in the direction of the loaded traffic, we certainly will decrease the movement of empty cars in the opposite direction. The question, therefore, resolves itself into which is the most economical car to use, the 60,000-lb. or the 80,000-lb. capacity, the cost of maintenance to be considered—grain and agricultural products to determine the length of the car.

Experience has taught us that our modern 60,000-lb. capacity box cars, designed carefully for strength, well and solidly built, cost us no more to maintain than the cheaper built and weaker designed 30,000-lb., 40,000-lb. and 50,000-lb. capacity cars now running on all the trunk lines, and it may be safely assumed that if 80,000-lb. capacity cars are well and thoroughly built of good material from careful designs, the cost of maintenance over our present 60,000-lb. capacity box cars would not be very materially increased and probably would be more than offset by the average increased earnings from the extra load carried per car in the direction of the light traffic, and the reduction of dead weight per ton of paying freight would be considerable.

The economical effect of lessening the dead weight and increasing the capacity may be illustrated by taking the problem of moving monthly over a division 100 miles in length, one million net tons of wheat with locomotives capable of pulling a dead load, including engine cars and lading, of 2,100 net tons, or slightly more, over the controlling grades, and moving in the opposite direction 100,000 net tons of general freight.

A 60,000-lb. capacity 34-ft. box car weighs about 30,000 lbs., and an 80,000-lb. capacity 38-ft. box car will weigh, say, 34,000 lbs., and the locomotive with coal, water, etc., we will assume, will weigh 100 net tons—using these figures our results are shown on accompanying table No. 1.

TABLE I.—MITCHELL ON LARGE CARS.

		East.	West.	East.	West.
Cars in maximum train		35	95	44	109
Capacity of cars, pounds		80,000	80,000	60,000	60,000
Average lading in each car, net tons		40	4	30	3½
Light weight of cars, net tons		17	17	15	15
Total weight of engines, cars and lading, net tons		2,095	2,095	2,080	2,098
Dead weight of engines and cars per train	Net tons	695	1,715	760	1,735
	Percentge	33.2	81.88	36.54	82.7
Paying freight per train	Net tons	1,400	380	1,320	3,633
	Percentage	66.8	18.14	63.46	17.3
Cost of haulage of 100 miles based on .604 of a cent per ton per mile	Dead weight	$139.37	$847.96	$167.73	$866.65
	Paying freight	564.90	41.63	505.96	37.97
	Total	704.27	889.59	673.69	904.62
Revenue per 100 miles at average of .941 of a cent per ton mile	Gross earnings per train	1,317.40	357.58	1,242.12	341.90
	Net revenue per train	613.13	Loss. 523.01	568.43	Loss. 562.72
Net revenue per car		17.52	Loss. 5.60	12.92	Loss. 5.16
Number of trains to move freight		715	264	758	306
Dead weight per net tons of capacity, pounds		850		1,000	
Total net revenue for moving specified freight		$437,950	Loss. $140,000	$430,675	Loss. $172,087
Net revenue for round trips			$297,950.00		$258,588.00
Average revenue per car per round trip			11.92		7.76
Total car loads, Eastbound			25,000		33,334
Average car movement East per day			833		1,111
Average trains per day East			24		26

The report of the Interstate Commerce Commission for the year 1890 shows that the average cost of carrying freight on all the railroads of this country is .604 of a cent per ton per mile and the average revenue .941 of a cent per ton per mile the factors upon which the average cost is based being the total operating expenses chargeable to freight traffic and the ton mileage.

If it costs .604 cents per ton per mile for hauling freight and the total weight of the train is 2,095 tons, 33.2 per cent. of that cost is chargeable to dead weight and only 66 8 per cent. to paying freight. Therefore, in our problem the cost of handling the dead weight of 35 cars of 80,000 lbs. capacity, and the locomotive, is .201 of a cent per ton per mile and the cost of hauling the paying freight is only 403 of a cent per ton per mile.

TABLE 2.—MITCHELL ON LARGE CARS.

		East.	West.	East.	West.
Cars per train		33	33	44	44
Capacity of cars, pounds		80,000	80,000	60,000	60,000
Average lading in each car, net tons		40	4	30	3½
Light weight of cars, net tons		17	17	15	15
Total weight of engines, cars and lading, net tons		2,095	835	2,080	907
Dead weight of engines and cars per train	Net tons	695	695	760	760
	Percentage	33.2	83.23	36.54	83.79
Paying freight per train	Net tons	1,400	140	1,320	1,467
	Percentage	66 8	16.67	63 46	16 21
Cost of haulage of 100 miles based on .604 of a cent per ton per mile	Dead weight	$139.37	$349.38	$167.73	$384.63
	Paying Freight	564.90	14.18	505.96	14 36
	Total	704.27	363 56	673.69	398 99
Revenue per 100 miles at average of .941 of a cent per ton per mile	Gross earnings per train	1,317.40	131.74	1,242.12	138.02
	Net revenue per train	613.13	Loss. 231.88	568.43	Loss. 2 0.97
Net revenue per car		17.52	Loss. 6.62	12.92	Loss. 5 93
Number of trains to move the freight		715	715	758	758
Dead weight per net tons of lading, pounds		850	9,930	1,000	10,634
Total net revenue for moving specified freight		$137,950	Loss. $165,751	$430,675	Loss. $197,815
Net revenue for round trips		$272,699.00		$232,860 00	
Average revenue per car per round trip		10.90		6.99	
Total car loads		25,000	25,000	33,334	33,334
Average car movement per day		833	833	1,111	1,111
Average trains per day		24	24	26	26

Our table, No. 1 (on page 32), gives figures which are misleading, as they are based on the locomotive being loaded to its full tractive power in both directions, but it is self-evident that if there are required 715 trains to handle the grain lading eastbound, there certainly must be an equal number of trains westbound, or else some of the power must return over the division light in order to get where it is needed. Considering this phase of the subject, the figures will be modified as per Table 2. From this second table it can be readily seen that with the 80,000-lb. capacity cars 35 cars will carry 1,400 tons of wheat, whereas, with the 60,000-lb. capacity cars 44 cars can only carry 1.320 tons, the weight of the train and its lading in both cases being practically the same, 2,095 and 2,080 tons, respectively. With a train of 80,000-lb. capacity cars we have to maintain 36 axles (if 4-wheel trucks are used), 72 less wheels, 72 less journal boxes, 72 less brasses, 72 less brakebeams and 36 less M. C. B. couplers and draft riggings to say nothing about the maintenance of nine less car bodies, and if we consider the total cars required for this service, or only the daily car movement of 1,666 as against 2,222, an estimate of the large saving which can be effected by the substitution of larger capacity cars can be readily made.

The table also demonstrates that the increased net revenue per car mile run in the direction of the heavy traffic will be 46 cents, provided the cars are loaded to marked capacity and when cars are only loaded to an their average tonnage of seven tons on the return trip a greater loss would result to the company in being obliged to have 571 lbs. more dead weight per net ton of paying freight, unless we consider the fact that if seven tons weight is the average lading of 60,000-lb. capacity box cars at present, a reduction of the car movement east of about eight per cent. (7.93), if the 80,000-lb. capacity car were substituted in their place (the heavy tonnage governing the number of cars required in the sevice) would result in a saving, as the average load in each car in the direction of the light movement would be increased to 8.8 tons, and the dead weight per net ton of paying freight would be 3,863 lbs., with the 80,000-lb. capacity car, instead of 4,285 lbs., as would be the case with the 60,000-lb. cars. Similar arguments can be used to show the advantage of using cars of still greater capacity than 80,000 lbs., hence the weakness of this argument in deciding on the length and capacity of cars.

The subject is of such magnitude, I know of no better way to solve it than by asking questions and let each department of the railroads answer them.

Query 1. Considering that a locomotive is an engine of destruction to the roadway and bridges, can we consider that each car behind such locomotive is an engine of destruction of equal magnitude, provided the weight of the car per running foot is the same as that of the locomotive?

Query 2. Can the weight per running foot of cars in the train equal to or exceed that of the locomotive without excess damage to track. If the weight can be in excess of that of the locomotive, how much excess would be proper?

Query 3. What maximum weight per running foot of the locomotive should be permitted on the various weights of rails?

Query 4. What speeds should govern such maximum weights per running foot?

Query 5. Provided each car weighed per running foot the same as the locomotive, would a train of 49 cars and locomotive damage the roadway twice as much as one train of 24 cars and locomotive?

Query 6. How much extra will it cost to maintain each additional foot in length of a car, the same general design to be followed as of the car 34 ft. long, the capacity in each case to remain the same?

Query 7. How much more will it cost to maintain a car of a given length of 80,000 lbs. capacity than one of 60,000 lbs. capacity—the general style of construction to be the same?

The Climate Along the Route of the Trans-Siberian Railroad.

(Compiled from Russian Official Publications.)

BY FRANK WALDO, *Ph. D.*

The rapid prosecution of the work on the Trans-Siberian Railroad and the agitation of the matter of securing for it an eastern terminus within the present Chinese or Corean territory, make the presentation of the main climatic features along the route of timely interest and importance. It is not generally known that Russia has made (and is still making) a magnificent climatic survey of her territory, and has issued a series of reports on this subject in such completeness and detail as has not been attempted by any other government. This has been brought about mainly by the wisdom and activity of Prof. Dr. H. Wild, the Director of the Central Physical Observatory, St. Petersburg.

The main results of this climatic survey are published in the 22 huge volumes of the Russian *Repertorium für Meteorologie*, besides accompanying charts. Very few of these volumes find their way to America, and the present writer believes himself to possess the only complete set in the United States. He has made use of these reports in preparing the following necessarily very brief sketch of the climate along the route to be followed by the railroad.

Temperature.—The average temperatures for the mid-winter month of January and the mid-summer month of July alone can be briefly mentioned.

In January, in latitude 55 deg., longitude 60 deg., at the western railroad terminal in Siberia the average temperature is about + 3 deg. Fahr., and toward the east this goes lower, becoming in longitude 75 deg., — 4 deg. Fahr.; which latter temperature continues to the southwestern part of Lake Baikal. To the eastward of this there is a very rapid lowering to nearly — 22 deg. Fahr., on the Middle Amur River in longitude 124 deg.; and from this point to Vladivostok the temperature gets higher, being at that seaport about + 3 deg. Fahr.

In the upper waters of the Yellow Sea the average temperature is about + 14 deg. Fahr., and in southern Corea it is above 32 deg. Fahr. In fact the difference between the average January temperature at the head of the Yellow Sea and that at Vladivostok is about as great as the difference between that at the latter place and the coldest region on the Amur River.

In July the average temperature along nearly the whole route is about 68 deg. Fahr., except on the Amur, where it is about 72 deg. Fahr. At Vladivostok the temperature is 68 deg. Fahr., and at the head of the Yellow Sea it is 77 deg. Fahr.

The *normal temperature* of any latitude is the average at all places along that latitude. When the temperature at any particular point along the parallel is colder than the average it is that number of degrees abnormally cold. At the centers of continents it is usually abnormally cold in winter and abnormally hot in summer.

Along this railroad route in January it is 70 deg. Fahr. abnormally cold in latitude 55 deg., longitude 60 deg., at the western terminus of the road, and this abnormal cold becomes greater and greater toward the east, until the middle Amur is reached, when it is 34 deg. Fahr. abnormally cold. Then there is at first a slow and then a very rapid lessening of the abnormal condition to 29 deg. Fahr. at Vladivostok. At the head of the Yellow Sea it is still 22 deg. Fahr. and in Southern Corea 14 deg. Fahr. abnormally cold. From longitude 70 deg. to longitude 98 deg. the temperature is about 14 deg. abnormally cold for the whole distance and through most of the Amur region it is 34 deg. abnormally cold.

During July it is about 9 to 11 deg. Fahr. abnormally warm, from the western terminus to the middle Amur (except at Lake Baikal, where it is only 5 deg. Fahr.), but from there at about longitude 128 deg. there is a rapid return to about normal temperature at Vladivostok. In Corea the temperature is still nearly normal.

Extreme Temperatures.—There is very little importance attached to the absolute maximum temperatures reached along the proposed railroad line, because the extremely high temperatures do not impede travel. As a matter of fact, however, the highest temperatures are quite constant, and vary from about 91 to 98 deg. Fahr.

It is quite another matter with the average extreme minimum temperatures. Starting at the western end of the railroad, at the southern extremity of the Ural Mountains, with a minimum of —31 deg. Fahr. there is a rapid and quite regular decrease to almost —58 deg. Fahr. at Tomsk (longitude 85 deg.), where the extreme minimum is reached. From thence there is a rise in the temperature to the region at the south end of Lake Baikal (longitude 104 deg.); then there is a descent of the minimum temperature to about —53 deg. Fahr. in the region of the highest northing of the Amur River (longitude 122 deg.), but from longitude 126 deg. there is a rapid rise in the minimums to —40 deg. at Vladivostok.

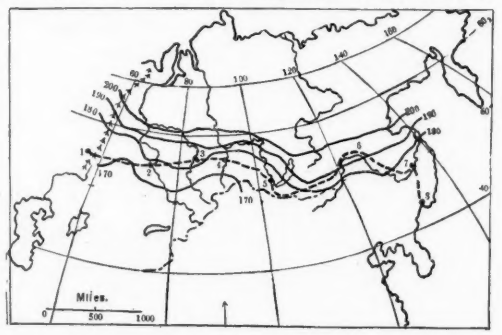
The minimum temperature at the head of the Yellow Sea would be perhaps + 5 deg. or + 3 deg. Fahr., so that a terminal on the shore of the latter would not be of much advantage, but the long route in the very cold middle Amur region would be avoided, and there would be a steady, although at first gradual, lessening of the minima from Lake Baikal direct to the Pacific coast. If the railroad runs down into the Corean Peninsula then the minimum temperature would be only from + 21 deg. Fahr. to + 14 deg. Fahr. These are the minimum temperatures to be expected (the average); at about longitude 90 deg. *extreme* minimum temperatures of below — 67 deg. Fahr. have been observed.

The average *annual range* of temperature (maximum —minimum) along most of the route is from 110 deg. Fahr. to 125 deg. Fahr.; but it has been as much as 160 deg. Fahr. in the region to the west of Lake Baikal. At Vladivostok the range is 90 deg. Fahr. and in southern Corea but 70 degs. Fahr.

Ice-Bound Waters.—There is no better criterion of the commercial possibilities of a railroad route than what we may term the conditions prevailing as regards the formation and continuance of ice on the rivers and lakes. This subject has been most carefully investigated for Russian Siberia by Rykatschew, of St. Petersburg, in the *Zweiter Supplement Band* of the Russian *Repertorium für Meteorologie.*

We will inquire into the times of closing and opening of the ice-bound waters, and also the times when the average temperature for the day (not just the minimum temperature at night) goes below the freezing point of water in the fall and when it goes above this point in the spring. These points will show the beginning and end of the winter; and the number of days intervening between these phases will show the length of the winter.

At the western railroad terminus the average daily temperature was below freezing, sharp frosts occur and ice begins to form about Oct. 23 and rivers are frozen, or, as we would say, navigation closes, about Nov. 2. To the eastward of this, at Omsk (longitude 75 deg.) sharp frosts and the formation of ice begin about Oct. 18 and permanent ice is found about Nov. 6, but about longitude 92 deg. the average temperature goes below 32 deg. Fahr., Oct. 15, and ice becomes permanent about Nov. 10



Temperature Chart—Trans-Siberian Railroad.

[On the accompanying chart the heavy dotted line shows the route of the Tran-Siberian Railroad from the foot of the Ural Mountains, in longitude 60, to Vladivostok, the eastern terminus. The figures along the route signify localities: 1 is the western terminus of the line; 2 is Omsk; 3 is Tomsk; 4 is Krasnojarsk; 5 is Irkutsk, near Lake Baikal; 6 is the Middle Amur River; 7 is Chabarowka, and 8 is Vladivostok.

The heavy continuous lines show the regions along which the average daily temperature remains below 32 deg. Fahr., or the freezing point of water during 170, 180, 190 and 200 days, respectively. These lines are not drawn for the neighborhood of Vladivostok and Northern Corea; but the line of 150 days would probably pass near the former, and the line of 100 days near the latter. These lines of equal 10-day periods lie much closer together near the coast than inland.]

or 12, and this relation continues to the region just east of Lake Baikal, where in longitude 114 deg. sharp frost occurs about Oct. 10 and permanent ice is formed on Nov. 2. From this point to the region of farthest northing (the middle) of the Amur River, longitude 124 deg, the ice conditions occur two or three days earlier; but to the east of this longitude the time of sharp frost is delayed quite rapidly as the coast is approached, and at Vladivostok ice probably does not form much before the earlier days of November nor become permanent before Dec. 1.

In the spring the times of departure of permanent ice and the cessation of sharp freezing weather and the passing of the average temperature above 32 deg. F. are about as follows:

At the western terminus on the frontier of European Russia the temperature gets above freezing about April 10 and the ice breaks up about April 21. To the eastward, the time of reaching the freezing point becomes slightly retarded to April 16, and the breaking up of the ice is delayed to May 1 at Tomsk (longitude 85 deg.); while at the lower end of Lake Baikal the time of thawing weather is about April 10, and the ice breaks up about April 26. To the east of Lake Baikal these times are slightly retarded to April 18 and May 5 respectively, in longitude 124 deg., the point of highest northing of the Amur River, from which place there is at first a slight and then a rapid acceleration of the times to about April 1 for the thawing weather and perhaps April 10 for the breaking up of the ice at Vladivostok.

The *duration of the winter* is shown by the number of

days during which the average daily temperature is below freezing, and also the number of days when the ice surface remains. At about latitude 55 deg., longitude 60 deg., the western terminus of the railroad, the ice covers the waters during 160 days, while the average daily temperature remains below freezing for about 173 days. These increase to about 180 days for the ice surface, and 185 days for average temperatures below freezing at Tomsk (longitude 85 deg., latitude 86 deg.), where there begins a short decrease to about 160 and 175 days respectively, at the southern end of Lake Baikal. Then there is again an increase to 185 days of ice and 194 days below freezing at longitude 124 deg., the highest northing of the Amur River. There is then a quite rapid decrease to 160 days of ice and 170 days below freezing at Chabarowka, the most easterly point on the Amur, longitude 135 deg. At Vladivostok the days with ice are *probably* about 140, and days of freezing temperatures about 150; while in the northern Yellow Sea waters these *probably* reduce to 20 days fewer and in southern Corea perhaps to 50 days fewer.

Precipitation.—The precipitation along the railroad route is small. Through its entire length from the western end to about longitude 115 deg. in the Amur region, the annual precipitation, including rain and snowfall, varies from about 12 to 16 in., and is a little below 12 in. just east of Lake Baikal. Along the Amur Valley to the east of this, there is an increase to over 20 in., and then a slight local decrease to 16 in. at Vladivostok. In northern Corea the precipitation is 24 in. and at the extreme south is about 39 in. From a certain time in the fal. until a certain time in the spring the precipitation falls as snow. In the three *winter* months about 2.5 in. of precipitation falls (this is measured as water after the snow is melted) in the region to the west of Lake Baikal For most of the region to the east of Lake Baikal the winter precipitation is only 0.5 in.

In the *spring* months the precipitation is between 2 in. and 2 5 in. from the western end to about longitude 95 deg., and then it decreases to less than 0.8 in. just east of Lake Baikal and on the upper Amur River; then from longitude 113 deg to the eastward there is at first a rapid increase to 2.5 in., and then a very slow increase, from the middle Amur, to 3.2 in. at Vladivostok.

In the fall there is about 3.2 in. precipitation along the entire route to Lake Baikal, where it decreases to 2 in. on the upper Amur, increasing again to about 5 in. on the lower Amur and at Vladivostok.

Assuming that half the precipitation in the fall and spring months is in the form of snow, on the average for the year the following amounts of water fall in this form:

At the western terminus 1.5 in., at Omsk (longitude 73 deg.), 1.3 in.; at Tomsk (longitude 85 deg), 1.5 in.; at Irkutsk, near the southern end of Lake Baikal, 1.5 in.; on the upper Amur, 0.5 in.; middle Amur, 1.0 in.; lower Amur, 1.4 in.; Vladivostok, 1.5 in.; northern Corea, 1 5 in.; southern Corea, 4.7 in. It is difficult to state how much snow this would make, or rather what depth of snow it takes to give this amount of water, for snow varies from being nearly as dense as water, when it is packed very tightly, and is almost ice, to the one-fiftieth the density of water when it is very fluffy. Usually the snow accumulates all during the winter in Siberia, but as it gets older and covered with new snow it packs down more solidly than when freshly fallen. If we put the average density as the one-tenth (and it is probably greater, and as much as one-fifth) that of water, then by removing the decimal points in the amounts of rain just given we have in inches the average greatest depth of the snow for the winter. Of course no reference is made to drifts. In the year 1890–91 the actual deepest level of the snow at Lake Baikal was about 7 in., and in the trans-Baikal (Amur) region only 6 in. We thus see that heavy snows such as we have along the Central Pacific Railroad will not be encountered on the Trans-Siberian route.

The amounts of the *summer* rains in June, July and August are of great importance in estimating the agricultural possibilities along the route of the railroad. From the western terminus (longitude 60 deg.) almost to Tomsk (longitude 85 deg.) the summer rainfall is about 6.3 in., increasing from 7 in. at Tomsk to 8 in. at Lake Baikal, it increases from this to nearly 12 in. along the middle Amur and continues at 12 in. almost to Vladivostok, where it decreases again to 8 in. In northern Corea the summer rainfall is from 12 to 16 in., and in southern Corea 20 in. We thus see that the rainfall distribution is very propitious for agriculture, when the small total rainfall is considered.

Humidity.—The annual average relative humidity varies from 75 per cent. in the western to 70 per cent. over the eastern part of the route, commencing the latter at about Lake Baikal. In winter there is a gradual decrease in the relative humidity from 85 per cent in the west to 75 per cent. in the extreme east, including the lower Amur region. In the spring a relative humidity of 70 per cent. at the west decreases to 60 per cent. at Lake Baikal and the upper Amur, and increases again to 65 per cent. at the extreme east.

In the summer the western half has a relative humidity of 70 per cent.; this decreases to almost 60 per cent. at Lake Baikal, and increases gradually again to nearly 80 per cent. in the extreme east.

In the autumn a relative humidity of a little over 80 per cent. (possibly 82) at the western terminus varies but little along the route to longitude 92 deg.; but from there it decreases with the southern trend of the road to almost 70 per cent. at the southern end of Lake Baikal, and from there to Vladivostok it remains just above 70 (perhaps 70 to 72) per cent.

Winds.—The average wind velocities in winter are about 9 miles per hour at the western terminus and decrease from that to 2 miles per hour for the region from Lake Baikal to the middle Amur region, from which point there is an increase to 13 miles per hour (immediately) at Vladivostok; but this increase is to only 9 miles per hour in Northern Corea.

In summer a velocity of about 9 miles per hour at the western terminus decreases to about 4 or 5 miles per hour (in longitude 100 deg.) west of Lake Baikal, whence it decreases slightly along the upper Amur; and from the middle Amur (longitude 120 deg.) increases again to 11 miles per hour immediately at Vladivostok, and to 7 or 9 miles per hour in Upper Corea.

This does not mean that there are no violent winds in Siberia, for there do occur terrible windstorms; but it does mean that there are long periods when there is little or no wind. The low wind velocities at the center of the Asiatic continent are quite the opposite of the strong winds at the center of our North American Continent.

The low wind velocities are favorable for the retention of the water in the ground, as evaporation increases rapidly with the increase of wind.

Conditions Affecting the Future of our Railroads.

During the recent commercial depression, the railroads have certainly encountered their full share of adversity, merited or unmerited. Several thousand men have been necessarily discharged, and their ability to maintain themselves and their families seriously impared. Thousands of owners, many of them dependent on the source of income here, have found it cut off and have had to sustain their families on a diminished income. With such an important factor of the commercial organism sick in body and soul, it is of interest and importance to determine, if possible, the nature of the disease and chances for recovery. We shall examine some causes of the financial condition of railroads, and the outlook, especially from the owner's or investor's point of view.

Many a book has essayed to tell of the black deeds of the railroad owner and official. Not a few Congressmen have by clever speech and loud denunciation, thus won and held their seats. But the essential factors of the present condition are not so numerous or complex, but that they can be briefly analyzed.

The conditions affecting the prosperity of railroads readily group themselves in a classification as to those without and those within the railroads; that is to say, those which are beyond the power of the railroad to control—as a general commercial depression—and those which, if the railroads were always wisely managed, they could control, as rate cutting and the building of needless parallel lines.

Of the factors without, the most important is the attitude of the public, commercial, legislative and journalistic. The best managed railroad in the world can never serve the community as well or return to its owners the same degree of profit if the people whom it serves are ignorant of the proper functions and rights of the railroad or fail to fairly recognize its efforts or its ability, as if they were well informed as to these. It has rights, rights as well defined as the protection of one's own house, which the state must insure. The people no less have their rights, but no statute of justice was ever made with the balance standing at forty-five degrees.

The growth of the proper enlightenment of the people toward railroads has been slow throughout the world. When the railroad first came, it seemed to do, and did so much good that people saw, but slowly, that a new economic force had come into the world which was capable of evil as well as of good. In different countries various methods of control developed. In England, private capital was ready and lines were built by private companies. On the continent where the traditional feeling obtained that all important matters pertaining to the public welfare could be better administered by the state, the railroads were generally built directly by the state or under state direction. Hence we find there a more stable condition, less subject to the influences of public opinion, and the railroads serving the people well, when the problem was simply the railroad versus the stage coach. Unquestionably, however, state control has proved not so well adapted to the solution of the intricate problems of national, sectional and communal competition of to-day.

In England, the policy was "laisez faire." This economic monster was loose for weal or woe. There was an abundance of both. Much the same feeling prevails with us, but in England, with its older civilization, the feeling grew of at least a need of some mediation between the people and the railroads. This was crystallized into the Board of Trade regulations, in the establishment of a railroad department as early as 1849. We began to have the same feeling in our older states, and Massachusetts established her State Railroad Commission in 1869; other states followed, and finally the Nation in 1887 by establishing the Interstate Commerce Commission. The Act which established it, was, and is yet, far from perfect, but it is so much better than nothing at all, giving a ground work to improve upon, that with few exceptions railroad managers recognize its benefits to-day.

We need only time to make the feeling universal among right-minded men that the railroad has rights, and among managers, that they cannot, and that it is not to their interest to disregard public sentiment. We have now the means in the Interstate Commerce Commission, if wisely administered, to foster this growth. The outlook is more favorable to the removal or amelioration of one great cause of railroad misfortune.

In regard to the establishment of a State Commission as a medium between the railroads and the people in this country, in New England we find it first, then gradually working westward. The same may be said of stability of rates. Rate disturbances never existed in New England to the relative importance they have elsewhere. Since the great "Trunk Line war of '76," rates have been more stable in that territory. The recent establishment of the Joint Traffic Commission is an important step toward the diminution of unreasonable rates on the important lines between New York, Philadelphia, Baltimore and Richmond and the Mississippi. If this agreement is found to work satisfactorily in Eastern territory the lines west of the Mississippi will, no doubt, follow before long with a similar arrangement.

As to causes within the railroads themselves which have led in the past to injurious results, may be mentioned, the railroad wrecker or speculator. The mention of the words recall well known instances of his work. Not only have the security holders suffered by his methods, but so have the communities which the lines served. At times the actual physical condition of lines which have been in the hands of such men, have well earned for them the terms of approbrium applied. No conditions could better foster the feeling that legislation alone was the only method of protecting the public. Happily, this sort of big game is nearly or quite extinct and necessarily the hunters. It is an instance in the growth of a new force in a community that cannot be escaped, but which has an end and a limit.

The wrecker involved the idea that one man controlled the ownership of a line, and that he could do as he pleased with his own. Hardly productive of less evil is what is still to be met with occasionally—the manager who thinks he can do about as he pleases. The motives are different, for the manager may be but doing what he believes to be for the best interests of the stockholders. He may slash rates and then wonder why a legislature should dare to make a rate permanent which he himself made to get business from a competitor. Looking over the country one can safely say that this kind of management is waning. The recognition of the science of railroad management is extending. It is a science as medicine. Temper has no more place in it than in medicine Certain fundamental principles guide those desiring to be guided, quite as surely as in any other science.

We are now brought to what is really the most disturbing element in the future prosperity of railroads—the labor question. Two-thirds of every dollar received for freight or passengers, very quickly goes to pay for manual labor in some form. The operation of a railroad necessitates that valuable property be entrusted to the care of a few men who can destroy it if they desire. The fast expresses are dependent, not only on the watchfulness of the engineer, but on signalmen, operators and trackmen. It fairly dazes one to contemplate it. Not only are men necessary in numbers, but in efficiency.

About one man in twelve in the country earns his living from the railroads. These men are constituted like other human beings—they have their desires and aspirations. It would not be well had they not. The more they earn the more they will enjoy life, be it the man of family or the shiftless laborer. The man who runs a train leads a hard life. Delays on the road may give them a little rest, and again they may have nothing to do for some hours. These hours are often spent loafing. The better minded may read, but listening to a clever talker is entertaining to most of us, and here it is that the labor agitator — whether for good or evil — foments trouble. Some one hears that on a neighboring such and such road concessions are given. The reason of their being given is not inquired into. "Why should we not have them?" A committee goes to the Superintendent and conferences are arranged. I need not recite the story further, it is too commonplace. In most cases the employee wins. This process has gone on for years, so that we are shown in the Senate report on wages (Fifty-second Congress) that in the majority of railroads examined, the wages have increased upward of 50 per cent. in 30 years, and, in some cases, 75 per cent. Comparing this with the decline in net revenue, and the outlook is alarming. Is the stockholder to become a residuary legatee?

On the railroads there are many forms of labor unions. One is conspicuous for the wisdom of its administration and the esteem with which it is held by managers and the public. The agitation of Martin Irons and the more recent trouble of 1894, known as the Pullman strike, show the other extreme and the destruction these may bring. Unions which resort to such lawlessness surely will not stand the test of time, what will? As I have said, a right minded railroad employee is human; he wants to provide for himself in old age and in sickness, and for his family in the event of his accidental death. Nothing has been devised which so nearly fulfills these conditions as the insurance societies of the English railroad companies. They are a part of all the companies and of the Railway Clearing House, and have been for many years. The feeling that the employing corporation is the employee's best friend is brought out conspicuously. Un-

favorable times may come necessitating a recognition on the part of the employee of assistance on his part to bridge them over, and often it has been nobly done. The employee, in the English plan, sets aside a very small portion of his pay, which is cared for by the insurance department, and he may work with the fullest confidence that he and his family will be cared for in time of trouble. Except on the Pennsylvania, the Baltimore & Ohio, and Burlington, which have the system, what can a hard-working, faithful employee in this country feel that the company will do for him or his family when he reaches old age? Our large systems have hospitals to care for the sick and the injured, but this is but a portion of what should be assured. The point to be emphasized is—the company will, as in England, care for you if your work is faithful. The "wreckers," the hot-headed managers, the poverty of our lines, have worked against this; but as time rolls on we shall find that this is no small matter, if a property is to be maintained for the best and lasting good of its security holders.

Accepting the forgoing as rather outlines upon which one may direct his thoughts, than exposition of the many conditions affecting the future of railroads, we may reflect as to what conclusions they lead us. We know that the railroad as an institution has developed among us and is of such importance that it must remain—it cannot be disposed of—and remaining, it is probable that there will not be any radical change in the method of administration, that is, such as passing into state or government control. They will remain as private corporations of more or less extent and more or less successful, as the management of each may be wisely directed.

The railroads must understand that in a highly organized state, an intermediate body coming between them and the people, has been found to be necessary. The railroads can prevent it from becoming tyrannical, by recognizing and helping it, not opposing it. Wisely managed railroads under ordinary conditions, will be remunerative, they will become the investment to a more or less extent of surplus capital in the district which they serve, and this is the strongest of ties between them and the people.

The future seems reasonably forshadowed, that notwithstanding the failures of the past, very many of the lines at present constructed will prove safe investments as to their bonds, and many of them regularly pay fair returns on their stock. The world cannot do without them. It has been a quick scholar if it has learned in fifty years how to use rationally, such a force. I believe it has learned the lesson well to-day.

GEORGE B. LEIGHTON.

TECHNICAL.

Manufacturing and Business.

Messrs. Jenkins Brothers (71 John street, New York, and 31 North Canal street, Chicago), makers of valves and packing, have brought out a new "96" packing for which great things are claimed. It is said that it will pack any kind of a cold or hot joint, and under any and all pressures of steam, superheated steam, oils, acids, etc.; it does not squeeze out, and makes joint instantly; it does not have to be followed up in joint, therefore saving considerable time, and it does not rot, burn or blow out, and will last as long as the metals which hold it.

Messrs. Eben Eskine Olcott, Percy Le Roy Fearn and Robert Peele have formed a partnership for the purpose of transacting a consulting, mining engineering and metallurgical business, with offices at 18 Broadway, New York, where Mr. Olcott has been established for a number of years. They are prepared to examine and report upon mines, to advise as to the best methods of working the same, and to serve as consulting engineers to mining companies. Gold and silver mining are their specialties.

The American Railway Equipment Company has been incorporated in Illinois by Robert H. Durphy, Ernest Mueller and John R. Durphy.

The Manufacturers' Advertising Bureau, Benj. R. Western, Proprietor, which has been located for a number of years at 111 Liberty street, New York City, will remove about April 15 to larger offices at 126 Liberty street.

The Standard Paint Co., which manufactures the P. & B. waterproof and odorless rubberoid car roofing and the P. & B. Giant insulating paper for lining refrigerator cars, has removed its offices and salesroom from 2 Liberty street to 81 and 83 John street, New York City.

New Stations and Shops.

Plans have been drawn and work will shortly be commenced on a new $250,000 station for the Pittsburgh & Lake Erie on the South Side, Pittsburgh, several hundred feet north of the present Smithfield street station.

Iron and Steel.

The iron and steel producers held their final meetings in New York last week to regulate the prices and production of steel. It was decided that the production of billets for April should be 235,000 tons, of which the amount allotted to each mill represented at the meeting was based on the capacity of each mill and the amount of tonnage produced by each last year. The newspapers report that prices in the Pittsburgh district have been fixed as follows: Soft steel billets, 4-in. and upward, $20.25; sheet bars, $22.25; tin plate bars, washed and cut, $22.25. This is an advance of from $3 to $3.25 a ton on billets since the recent upward movement commenced. It is stated that these prices are made for one month only. When the advanced prices of iron ore for the coming season were announced a short time ago it was deemed necessary to make some arrangement for better prices and accordingly the present agreement was formed. Two or three large companies have refused to sign it, among which are Illinois Steel Co. and Schoenberger & Co., of Pittsburgh.

The Pennsylvania Railroad has placed another large order for rails, to weigh 100 lbs. to the yard.

The Canton Rolling Mill Company, of Canton, O., has built a 50-ft. addition to the main building and two new annealing furnaces.

Work was begun last week upon the rolling mill of the Block-Pollock Company, at Carthage, O. The plant will give employment to about 1,000 men.

Perfect Curtain Fixture.

The Brussells Tapestry Co. has put upon the market a car curtain fixture known as the "Perfect" self-adjustable curtain fixture, which was illustrated and described in the *Railroad Gazette*, Jan. 17, 1896. The company is receiving many orders from leading railroad companies. Railroad officials who have examined and tried the fixture strongly endorse it for its simplicity and durability.

A Good Specimen of Cast Iron.

In removing a cast iron bushing of a locomotive cylinder recently at the Baldwin Locomotive Works, the excellent quality of the iron was strikingly illustrated. The cylinders were originally about 20 in. in diameter, and for some reason been bushed to 19 in. by the builders. It was decided to remove the bushing, and it was cut out with a boring bar until a thin shell was left in which the metal was $\frac{1}{32}$ to $\frac{1}{8}$ in. thick, forming a complete cylinder. When the shell was cut open the metal spread out flat like a piece of sheet iron.

Launch of a Japanese Battleship.

There was launched on the 28th ult., from the Elswick yard of Sir G. W. Armstrong, Mitchell & Co., the twin-screw battleship Yashima, built for the Japanese Government. The vessel is of the following dimensions: Length over all, 412 ft.; between perpendiculars, 372 ft.; maximum molded breadth, 73 ft. 6 in.; mean draught, 43 ft. 7¼ in. Displacement, when loaded, about 12,300 tons. The engines for propelling the vessel are of the triple-expansion type, having cylinders 40 in., 59 in., and 88 in. diameter, by 45 in. stroke. The boilers, which are ten in number, are of the ordinary return-tube type, single ended, each having four furnaces, and will supply steam at a pressure of 155 lbs. to the square inch. The estimated horse power is 10,000 indicated with natural draft, and 13,500 indicated with limited forced draft. The corresponding speeds for these powers are 16¾ and 18¼ knots respectively. The coal capacity will be at normal draft 700 tons, but the bunkers are constructed to hold 1,200 tons. The armament will consist of four 12-in. 49-ton guns, placed in pairs in two barbettes situated forward and aft. There will be 10 quick-firing 6-in. guns carried on the broadside. Six of these will be on the upper deck, one at each corner of the central battery. The remaining four 6-in. guns will be on the main deck. There are also 24 3-pounder quick-firing guns. There are four submerged torpedo discharges, and one above-water discharge in the bow. The armor belt is 226 ft. long by 8 ft. deep, the thickness of armor being 18 in. as a maximum, with 16 in. and 14 in. at the ends. On the barbettes the armor is 14 in. thick above the main deck and 9 in. below in front, but is 5 in. thick at the back, where it is behind the 4-in. armored screens, which extend from the barbettes to the sides. Above the belt to the main deck there is 4-in. armor. The shields to the barbette guns are 6 in. thick at the fronts, thinning to the rear, the arrangement being much the same in principle as that adopted in the Magnificent. The four 6-in. guns on the main deck are in armored casemates. All thick armor is face-hardened on the Harvey principle. The vessel will have a complement of 600 men.—*The Practical Engineer.*

The Slide Valve Study.

The locomotive laboratory at Purdue University has been given over during the past few days to the Master Mechanics' Committee on Slide Valves. Tests have been conducted to determine the power necessary to move balanced and unbalanced valves. The work has been carried on by Mr. G. R. Henderson, chairman of the committee, and Mr. L. R. Pomeroy, member of the committee, assisted by the regular corps of laboratory attendants. Mr. H. G. Hammett, of the Richardson Slide Valve Company, and Mr. J. T. Wilson, of the American Balance Slide Valve Company have been present; also Mr. F. W. Thomas, Engineer of Tests Norfolk & Western Railway, and Mr. Angus Sinclair, Secretary of the Master Mechanics' Association.

THE SCRAP HEAP.

Notes.

According to Montana papers the Bozeman tunnel of the Northern Pacific, which has been impassable, in consequence of a fire, for several months, will be lined throughout with concrete.

At Parkersburgh, W. Va., on March 31, the Paymaster of the Baltimore & Ohio, under direction of the United States Court, which now controls the operation of the road, ignored garnishment processes against employees.

The docks and warehouses of the Plant (Railway) System at Brunswick, Ga., were burned on April 2, together with buildings and wharves adjoining, large quantities of rosin, lumber and other merchandise. Total loss estimated at $400,000.

A flood prevailed in eastern Tennessee on April 1, the most extensive in 30 years. Near Knoxville a pier was carried away from under a new bridge across the Tennessee River. There were floods in central New York on the same day, and the New York Central tracks were submerged at several places. Further west there was a severe snowstorm.

Congressman Moody, of Massachusetts, has introduced in the House, "by request," a bill requiring railroads to furnish sleeping car berths at 50 cents a night for poor people. It is held that passengers of limited means "should have the privilege of lying down by the payment of appropriate prices for economical accommodations."

An express train of the St. Louis & San Francisco was robbed near Richland, Mo., on the night of March 31, about $1,000 being taken from the express car. On the same night a passenger train of the Baltimore & Ohio was boarded by robbers near Garrett, Ind., and one passenger was thrown off the train while it was running at high speed. Five robbers were subsequently arrested and one of them was fatally shot by the constables.

A correspondent reports that the Southern Railway is complaining of the action of the Mayor of Charlotte, N. C., in enforcing the state law prohibiting the running of freight trains on Sunday. It appears that the law permits perishable freight to be moved; but the Southern has not enough vegetable traffic to make full train loads, and therefore suffers loss by being forbidden to fill out trains with ordinary merchandise.

The city of Brooklyn, N. Y., will this year, as last, give employment to poor people on vacant lots in the eastern part of the city, where last year potatoes and other crops were raised at a profit; and the Brooklyn Elevated Railroad, being applied to by the city officials, has agreed to carry the workmen to and from the fields free. These passengers will be going in a direction opposite to the principal traffic, both morning and evening, so that the cost to the railroad will be almost nothing.

The St. Louis & Suburban Railroad Company, which has run a mail car on its street railroad for about four years, and which was the first company that ever ran a postal car on a street railroad, has notified the government that it will decline to renew the present contract, which expires on April 30. It appears that the compensation is deemed by the company insufficient; and from statements made in a St. Louis paper it would seem that the rate, 12 cents a mile, is below the cost of operation.

Union Elevated Loop, Chicago.

On April 2, the permit was secured to erect the superstructure and stations of the west side of the Elevated Loop. This portion of it is on Fifth avenue from Lake street south to Van Buren or Harrison, according to the success of the promoters in getting the consent of the property owners. It is very much desired by the company to use Van Buren street for the south side of the Loop, but an opposition has been developed among the property owners, and it may be necessary to use Harrison which is the next street south. Work on this superstructure will begin immediately.

The Technical Club—Chicago

The Technical Club will be established at 228 and 230 South Clark street, having leased the building for 10 years. The building is four stories high, and the club has taken all but the first story. Plans for converting the building into a modern clubhouse have been completed by Dankmar Adler. It will be recalled that the Technical Club is a recent institution modeled after the Engineers' Club of New York. The Chicago club already has a membership of approximately 200, and includes civil, mechanical and electrical engineers, architects and people generally interested in technical work. It will be exclusively a social club. The officers are: President, R. W. Hunt; Secretary, C. E. Billin; treasurer, H. F. J. Porter.

One-Sixth Mill Per Ton Per Mile.

A tow of coal barges, made up solid and measuring 1,030 ft. long by 208 ft. wide was recently taken 1,500 miles down the Mississippi without an accident. The fleet consisted of 37 barges which, according to Western river style, were put together only for the trip and sold for wood when the coal was out of them. They were towed by two steamers. The contents of the tow amounted to 900,000 bushels, weighing over 36,000 tons. The value of this coal figured at 8 cents a bushel is $72,000. The cost of making the round trip from Louisville to New Orleans is about $250 a day; multiplied by 30 days for the trip, gives a total of $7,500. A car of coal averages 600 bushels, so that it would take a train of 1,500 cars to carry the amount of coal in this tow. The rail rate is approximated at $30 per car per day (which is a low estimate), which would foot up to about $18,000 if the round trip were made in four days. This leaves a balance of $10,500 in favor of river transportation, showing the necessities of river improvements.—*Waterways Journal.*

The quantity of coal named (36,000 tons) at 6 mill per ton per mile, a common rate by rail, would cost, from Louisville to New Orleans, approximately 800 miles, nearer $180,000 than $18,000. If it had to go by rail it would probably conclude to stay at home.

Calcium Carbide.

In its issue of April 15 the *Progressive Age* (280 Broadway, New York), will publish a report on the cost of making calcium carbide. A special study was made for the *Progressive Age* at Spray by Messrs. E. J. Houston and A. E. Kennelly, electricians, and Dr. L. P. Kinnicutt, chemist. Prof. Houston and Dr. Kennelly stand in the first rank of electricians, and Dr. Kinnicutt is Director of the Department of Chemistry at the Worcester Polytechnic Institute. We look for some really reliable and authoratative information from these gentlemen.

Engineers for the D. P. W. of New York.

The Civil Service Board will hold another examination for Engineer-Inspectors in the Department of Public Works on Wednesday, April 22

The River and Harbor Bill.

The River and Harbor Appropriation bill has been reported to the House. The total appropriation carried in the bill is $9,767,630. The last Congress appropriated $11,478,180 for rivers and harbors, or about $1,700,000 more than carried in the present bill. In addition to the cash ap-

propriation which will be available at the close of this fiscal year, contracts are authorized in the bill for an amount in addition aggregating $51,000,000.

The bill makes these provisions for harbors:

Boston.—$70,000, to be used in the improvement of the harbor other than the main ship channel. Contracts may be entered into to provide a ship channel 1,000 ft. wide and 27 ft. deep, to cost in the aggregate $1,145,000.

Buffalo.—Provision made for contracts for extending the breakwater southerly to Stony Point, the sandcatch pier to be extended to the bulkhead line; the improvement not to cost in the aggregate more than $2,200,000.

Canarsie Bay, N. Y.—$10,000.

Charlotte, N. Y.—$12,000.

Dunkirk Harbor, N. Y.—$19,000 and contracts are authorized to complete the modified project, not to exceed $398,258.

Glen Cove, N. Y.—$8,000.

Bay Ridge, Gowanus Bay, Red Hook, and Buttermilk Channels, New York Harbor.—$60,000. The work shall be begun at the southerly end of Bay Ridge Channel and continue through it and the others, in the order named, until completed, so that each shall have a uniform mean low-water depth of 26 ft.; $5,000 to be expended in dredging Gowanus Canal from Percival street to Hamilton Avenue Bridge. Contracts are authorized for the completion of the work, not to exceed $777,300.

Newtown Creek.—Contracts authorized not to exceed in the aggregate $420,000; $30,000 is appropriated.

Ogdensburg, $20,000.

Oswego, $60,000

New York Harbor, $60,000.

Tonawanda Harbor, $50,000.

Channel between Staten Island and the New Jersey shore, $13,000.

Peekskill, $10,000.

Mattituck, $10,000.

Cape Vincent, $25,000.

Raritan Bay, N. J., $32,000.

Savannah Harbor, Ga.—$5,000; contracts authorized to complete steamboat channel between Beaufort and Savannah not to exceed $1,093,950.

Cleveland, O.—$80,000 is appropriated, and contracts are authorized to complete work to the extent of $1,351,000.

For Sabine Pass, Tex., contracts for $1,403,856 are authorized.

Duluth, Minn., and Superior, Wis.—In addition to $50,000 appropriated, contracts for $3,080,553 are authorized to complete the deepening of the harbor.

Yaquina Bay, Or., gets $25,000, and contracts for $1,000,000 are authorized.

Gray's Harbor, Wash., receives $10,000 and a contract authorization of $990,000.

Among the river appropriations are $125,000 for the Harlem and $10,000 for the Bronx; East River and Hell Gate, $60,000; Passaic and Shrewsbury Rivers, $15,000 each, and Raritan, $20,000.

The Delaware, from Trenton to its mouth, receives $500,000. The Cumberland secures $720,000 for its entire length, and $567,000 contracts; the Ohio about $2,390,000.

For the Illinois and Mississippi Canal $5,710,960 of contracts is authorized. Chicago River gets $700,000 and Calumet River, $50,000.

The appropriation for the Mississippi River is divided into many parts. The total is $1,354,000, with contracts authorized to the extent of $14,000,000 more. For the Missouri additional contracts not exceeding $250,000 per annum are ordered and about $500,000 is appropriated.

Semi-Centennial of the Pennsylvania Railroad.

April 13 next will mark the semi-centennial of the Pennsylvania Railroad, the charter for the company having been granted on April 13, 1846. The actual work of construction on the road did not begin until nearly a year later, and the line was not opened to Pittsburgh until 1854. The officials of the company propose to mark the occasion, among other ways, by a large public meeting in Philadelphia, to which will be invited everyone who has been connected in any way with the lines east of Pittsburgh. As a permanent record of the semi-centennial, a history of the Pennsylvania Railroad is being written. Its general preparation is in charge of Mr. T. N. Ely, Chief of Motive Power, and Mr. James McCrea, First Vice-President of the Pennsylvania Lines West of Pittsburgh. Mr. J. Elfreth Watkins, who has heretofore done related work for the Pennsylvania, is the active editor, and Col. S. H. Church, Car Accountant of the Pennsylvania Company, is collecting material for that portion of the book relating to the western lines of the Pennsylvania.

The programme for the celebration next Monday provides for a reception to the operating officers of the company by the President and Board of Directors at noon, a reception to the general officers and heads of departments, and men distinguished in public and private life at 1 p. m., and a public meeting of the stockholders at the Academy of Music at 3 p. m., which is to be addressed by the Governor, the Mayor of Philadelphia, Frederick Fraley, J. T. Brooks, of Pittsburgh, and Joseph H. Choate, of New York.

Another Electric Railroad Bridge falls.

The steel bridge at Mount Clemens, Mich., spanning the Clinton River, over which the cars of the Rapid Railway, an electric line, run, gave way last Tuesday while a motor car and three loaded gravel cars were crossing. The train was precipitated into the river. Motorman William Spencer was seriously injured. Four other men who were riding on the cars escaped by jumping.

CAR BUILDING.

The Grand Rapids & Indiana has placed an order with the Pullman Car Company for six vestibuled coaches, which are to be run on trains between Cincinnati and the Lakes.

BRIDGE BUILDING.

Annapolis, Md.—The legislature has passed the bills providing for the building of a free bridge over the Choptank River between Caroline and Talbot counties.

Avon, Conn.—It is stated that the contract has been let to the Berlin Iron Bridge Co. for a 169-ft. single-span bridge to replace the one recently carried away by a freshet.

Bay City, Mich.—The Detroit & Mackinac Railway Co. is soon to have a steel bridge built over the Kawkawlin River, at Bay City.

Brookville, Ind.—Bids will be received till April 20 for building a steel truss bridge of 55-ft. span and 14-ft. roadway. F. R. King is County Auditor.

Buffalo, N. Y.—Bids for a bridge over the Erie Canal at Porter avenue were opened last week. The lowest bid for the substructure was that of the Buffalo Dredging Co., for $19,497.75, and for the superstructure that of the Buffalo Bridge & Iron Co., for $51,500. This makes the total cost more than double the sum appropriated for the work, so nothing can be done till the appropriation is increased.

Dillon, Mont.—It is reported that proposals will be received till April 18 for two bridges over the Big Hole River, one at Fox and one at Wisdom. T. J. Murray is the County Clerk.

Estill Springs, Tenn.—The heavy rain of March 31 washed away several bridges in this vicinity, including the new iron bridge over Elk River at Lock Miller Ford, three miles below here.

Fort Madison, Ia.—The Board of Supervisors of Lee County will let contracts on June 1, for building all bridges for one year. John Walljasper is County Auditor, and J. R. Robertson County Engineer.

Gate City, Va.—The bridges of the South Atlantic & Ohio Railroad at Mendotta and Moccasin Gaps, which were carried away by the recent high water, will be rebuilt by the company. The bridge at Taylors Mill, which was also destroyed, will be rebuilt by the county.

Hammond, Ill.—A bill has been passed by Congress authorizing the Hammond & Blue Island Railroad to build a bridge over the Grand Calumet River, near Hammond. C. W. Hotchkiss, 620 La Salle street, Chicago, can give further information.

Harrisburg, Pa.—A new 60-foot bridge is soon to be erected over Trimmer's Run, on the road from East Berlin to Harrisburg.

Harrodsburg, Ky.—Bids will be received till May 4 for constructing a steel bridge over Chaplin River, near Dixville. James L. Neal and O. W. Lester are on the Bridge Committee.

Hawesville, Ky.—A bridge to cost about $4,000 will probably be built across Blackford Creek. D. L. Adair is County Engineer.

Houston, Tex.—An iron bridge is soon to be built over Clear Creek.

Lexington, Ind.—A 60-ft bridge will probably be built by Scott County, near Lexington. J. L. Fisher, of Scottsburg, Ind., is County Auditor.

Lincoln, Neb.—The contract for building the county bridges for the year has been let to the Wrought Iron Bridge Co., of Canton, O.

Livermore Falls, Me.—It has been decided to award the contract for a bridge at this place to the Massalon Bridge Co., of Ohio, for $13,100. This is $30 higher than the lowest bid submitted, but it is claimed the Massalon company's plans were better.

Madison, Ga.—A single-span bridge of 100 ft., with a 12-ft. roadway is being considered by the county officers. Address C. W. Baldwin, Clerk, Morgan County.

Medo, Minn.—Proposals will be received till April 22 for an iron bridge here. R. S. Hughes, of Mankato, is chairman of the board of County Commissioner.

Middlesex, Pa.—The contract for a single span bridge of 173 ft., with an 18-ft. roadway over Conodoquinet Creek has been let to Nelson & Buchanan, of Chambersburg, Pa.

Nashville, Tenn.—A company has been formed to build a bridge over the Forked Deer River, in Lauderdale County.

Norway, Me.—The R. F. Hawkins Iron Works, of Springfield, Mass., have been given the contract for replacing the bridge over the Crooked River, which was recently carried away by a freshet.

Painesville, O.—An iron bridge 400 ft. long will soon be built across the Grand River, at the foot of Main street.

Philadelphia.—Work has been begun on the draw bridge over Frankford Creek. A description of this bridge was given in our issue of Feb. 7.

Shelbyville, Ky.—The construction of a 90-ft. bridge to cost about $1,500 is being considered. E. J. Doss is County Clerk.

Tarborough, N. C.—It has been decided to construct an iron and steel bridge, 580 ft. long across Tar River.

Totamy, Pa.—The contract for the bridge here has been let to the Wrought Iron Bridge Co., of Canton, O., for $9,567.

Upper Marlborough, Md.—A bridge of a 50-ft. span will probably be built near Branchville, and also one over the Queen Chapel road. T. E. Williams is County Clerk.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Pennsylvania a condition in a deed of a right-of-way for erection of a station, the character of which is not specified, is complied with by erection of a board shed, without the placing of an agent there, it being in structure and management like most of the stations on the road.[1]

In Michigan it is laid down that when a railroad has been abandoned in the manner prescribed in the statute, and no reasonable provision made for traffic between the points abandoned, those who have contributed to its construction are entitled to have their contributions refunded, with interest for five years.[2]

In Minnesota property in the hands of a common carrier in transit to a place outside of the state is not subject to garnishment, though it is within the state at the time of the service of the garnishee summons.[3]

In the Supreme Court of the United States it is held that where a foreign corporation owns a railroad lying partly within and partly without a state, the state may tax such portion of the tolls received for the use of the road as was received for the use of the portion within the state.[4]

In Virginia it is held that where two railroad companies are consolidated under authority, the presumption of law is, until the contrary appears, that the united company is subject to all the liabilities of those out of which it is created, and may be sued thereon under its new name as if no change had been made in the organization of the original corporations.[5]

Injuries to Passengers, Employees and Strangers.

In Texas it is laid down that a carrier is not liable because the agent at a depot, at which a passenger was waiting for a train, was cross, and refused to tell her the name of the town or where she could find an hotel, and, on her asking for water, merely pointed to a tank some distance away, or because men and boys around the station jeered and laughed at her.[6]

In Maryland a carrier must use all the means at hand for the purpose of enabling it to use a passenger coach before it will be excused for using a baggage car for the transportation of passengers.[7]

In this case it was also ruled that in an action for death of deceased killed by a train while crossing an intervening track to the depot from a train from which he has just alighted, plaintiff is entitled to introduce a rule of defendant that when a passenger train is at a depot receiving or discharging passengers on double track no other train will attempt to pass till the train at the station has moved on.[8]

In Nebraska it is laid down that a master who calls a surgeon to aid an injured employee is not liable for the negligence or malpractice of the surgeon, providing the latter has knowledge and skill ordinarily possessed by other surgeons, and the master had no reason to suspect that the surgeon would fail in his duty.[9]

In Texas a railroad made a "flying switch," in rainy and freezing weather, when the braking gear could not be operated because of the ice, whereby plaintiff's husband was killed. The Supreme Court rules that evidence that it was the general custom of railroads to make flying switches was irrelevant, unless a custom of making them under the same conditions was shown.[10]

In New York it is held that a railroad is chargeable with negligence where it uses in a train for distribution of rails a car with a drawhead broken off, but for which an employee on the train would not have been injured.[11]

In the Federal Court, where a plaintiff was injured in a collision between a regular train, on which he was working, and a special train, following it, which had been sent out without notice to the conductor of the stopping places of the train in front, and without any regular running schedule, it being the rule of the company that a following train should keep at a safe distance behind a train in front, but also that the train dispatcher should see that trains were kept at such safe distance, it was held that it was a question for the jury to decide whether the railroad company was negligent in the management of the special train.[12]

In New York it is held not contributory negligence, as a matter of law, for a passenger to ride on the steps of a street car, where it was so crowded that he could not get into the car or on the platform, and the conductor permitted him to ride on the steps.[13]

In Missouri, where, in an action for injury from being thrown from a cable car while rounding a curve, the evidence clearly shows that the accident was caused by a lurch of the car on account of its speed, and that its speed was necessary to carry the car around the curve, a demurrer to the evidence should be sustained.[14]

In the Federal Court it is held that one who is injured in a railroad accident is not chargeable with contributory negligence because he was, at the time, riding on the platform of a car, if he would have been equally injured had he been inside the car.[15]

In Missouri a railroad company contracting to carry a passonger beyond the limit of its own line is liable for the wrongful ejection of the passenger by the servants of a connecting line.[16]

In New York it is held by the Supreme Court that negligence of a railroad in leaving a train standing on a crossing is not the proximate cause of the death of a person struck by a train on the next track, merely because, but for the standing train, he would have crossed the tracks before the arrival of the other train.[17]

In New York it is ruled that it is negligence to run a train 25 or 30 miles an hour at a crossing within a city which by ordinance forbids a greater speed than 7½ miles an hour.[18]

The Supreme Court of Kansas holds that where the engineer of a train moving six miles an hour suddenly, and without warning to a brakeman standing on an open car for the purpose of signaling the engineer when to slack up to make a coupling with cars standing some distance ahead, applied the steam jam, whereby the speed of the train was suddenly lessened, and the brakeman thrown to the ground and injured, the brakeman could recover.[19]

In Texas it is held that the foreman of a switching yard, having power to employ and discharge other employees, who are subject to his control, is not the fellow servant of such employees, as regards his acts in assisting in the making up of trains.[20]

In the same state it is said that it is the duty of a railroad to establish rules reasonably sufficient to protect its employees, but whether or not such rules have been established is a question for the jury.[21]

The Supreme Court of Nebraska holds that where a car running seven miles an hour collided with a stationary coal car, the fact that the drawbar in connection with the coupling was bent was not evidence that that make of couplings was defective.[22]

In Texas it is held that where plaintiff's duty was to board moving cars, to render him negligent the car boarded must have attained such a dangerous speed that a prudent person in plaintiff's position would not have boarded it.[23]

[1] Caldwell v. East Broad Top, 32 Atl. Rep., 85.
[2] Flint & P. M., 63 N. W. Rep., 303.
[3] Stevehot v. Eastern Ry., 63 N. W. Rep., 256.
[4] N. Y., L. E. & W. v. Com., 15 S. Ct., 896.
[5] Langhorne v. Richmond Ry., 22 S. E. Rep., 159.
[6] M., K. & T. v. Kendrick, 32 S. W. Rep., 42.
[7] Balt. & P. v. Swann, 32 Atl. Rep., 175.
[8] Balt. & O. v. State, 32 Atl. Rep., 201.
[9] C. B. & Q. vs. Howard, 63 N. W. Rep. 872.
[10] W., M. W. & N. W. vs. Duncan, 31 S. W. Rep. 562.
[11] Lucco v. N. Y. C. & H. R., 34 N. Y. S., 277.
[12] N. Pac. v Poirier, 67 Fed. Rep., 881.
[13] McGrath v. B., Q. C. & S., 34 N. Y. S., 365.
[14] Hite v. Met. St Ry., 32 S. W. Rep., 33.
[15] K. & A. V. v. White, 67 Fed. Rep., 481.
[16] Cherry v. K. C., Ft. S. & M., 1 Mo. App. Rep., 253.
[17] Dubois v. N. Y. C. & H. R., 34 N. Y. S., 279.
[18] Crosby v. N. Y. C. & H. R., 34 N. Y. S., 714.
[19] K. C., Ft. S. & M. v. Murray, 40 Pac. Rep., 646.
[20] T. & P. v. Reed, 31 S. W. Rep., 1058.
[21] Gulf, C. & S. F., v. Finley, 32 S. W. Rep., 51.
[22] C. B. & Q., v. Howard, 63 N. W. Rep., 872.
[23] T. & P. v. Reed, 31 S. W. Rep., 1058.

MEETINGS AND ANNOUNCEMENTS

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Central of New Jersey, 1¼ per cent., payable May 1.

Delaware, Lackawanna & Western, 1¾ per cent., payable April 20.

Eel River, 1¼ per cent., guaranteed, payable April 6.

European & North American, 2½ per cent., payable April 15.

Freehold & Jamesburg Agricultural, 3 per cent., payable April 6.

National Railway Co., quarterly, 1½ per cent., payable April 10.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Central of New Jersey, annual, company's office, Jersey City, N. J., May 8.

Chicago & North Michigan, annual, company's office, Traverse City, Mich., April 15.

Chicago & West Michigan, annual, company's office, Grand Rapids, Mich., April 15.

Cleveland, Lorain & Wheeling, special, company's office, Hickox Building, Cleveland, O., April 10.

Elmira & Lake Ontario, annual, company's office, 20 Whitehall street, New York, May 7.

Lake Shore & Michigan Southern, annual, company's office, Cleveland, O., May 6.

Michigan Central, annual, company's office, Detroit, Mich., May 7.

New York Central & Hudson River, annual, company's office, Union Station, Albany, N. Y., April 15.

New York, Chicago & St. Louis, annual, company's office, Cleveland, O., May 6.

Pittsburgh, Cincinnati, Chicago & St. Louis, annual Penn avenue and Tenth street, Pittsburgh, Pa., April 14.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Railway Association* will hold its spring meeting at the Burnett House, Cincinnati, O., April 15

The *Roadmasters' Association of America* will hold its next annual convention at Niagara Falls, beginning on Sept. 8.

The *Railway Signalling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago Mr. George M. Basford, is secretary, The Rookery, Chicago.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. S. T. Johnston, Monadnock Block, Chicago, is secretary of the association.

The *Engineers' Club of Columbus, (O.)*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers' and Architects' Association of Southern California* meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month, except June July, August and September.

The *Engineers' Society of Western New York* meets on the first Monday of each month at the Society's rooms in the Buffalo Library.

New England Railroad Club.

The regular meeting of the Club will be held on Wesleyan Hall, 36 Bromfield street, Boston, Tuesdat April 14, 1896, at 8 p. m. The subjects for discussiay are: "Packing for Piston Rods and Valve Stems" and "Relative Value of the Different Types of Slide Valves."

New York Railroad Club.

The next regular meeting of the club will be held on Thursday, April 16, 1896, at 8 o'clock, p. m., at No. 12 West Thirty-first street, New York, when the topic for discussion will be "How Can Our Station Service be Improved?" The discussion will be opened with a short paper by Mr. Frank E. Haff, Superintendent of Stations, Long Island Railroad.

Engineers' Club of St. Louis.

President Ockerson called the club to order April 1, at 1600 Lucas Place, 30 members and 8 visitors present. Mr. Julius Pitzman then read a paper on "Municipal Engineering," his address having special reference to the laying out of grades and subdivisions, and of parks and public places. The address was illustrated by numerous maps and diagrams.

The Saratoga Conventions.

Extensive preparations are being made by the hotels of Saratoga for the accommodation of all who will attend the annual conventions of the Master Car Builders' and Master Mechanics' Associations in June. The following hotels have signified their intention of opening for the occasion: Hotel American-Adelphi, G. A. Farnham, Proprietor; Clarendon Hotel, Edw. P. Harris, Manager; Grand Union Hotel, Woolley & Gerrans, Managers, and the Windsor Hotel, R. G. Smyth, Manager.

St. Louis Railway Club.

The organization of this club was effected at a meeting at the Southern Hotel, St. Louis, last week. The following officers of the club were elected: *President*, Mr Frank Reardon, Missouri Pacific. *Vice-Presidents*, Mr. C. B. Adams, Wabash; Mr. W. G. Besler, Burlington; Mr. John J. Baulch, Wiggins Ferry. *Executive Committee*, Prof. Johnson, Washington University; A. G. Steinbrenner, Master Car Builder; Mr. Jacob Johann; E. M. Neel, Superintendent Big Four; J. W. Stokes, Master Mechanic St. L., I., M. & So.; Mr. C. S. Crane, General Passenger Agent, Wabash; Mr. W. D. Holliday, Assistant General Freight Agent, Big Four. *Secretary*, Mr. W. A. Hobbs; *Treasurer*, Mr. S. G. Scarritt. The club starts out with a membership of about 125, and with every promise of a useful existence.

Western Society of Engineers

The regular meeting of the Western Society of Engineers was held in the Society's rooms, 1737 Monadnock Block, Chicago, on April 1. At this meeting it was decided to appoint a committee to inspect the old Post Office Building while it is being torn down. The object of this inspection will be to determine the condition of the iron and steel used in the construction of the building. The demolition of this building presents a favorable opportunity to get data on this subject because more iron work was used in it than in any other building constructed at that time in Chicago. The committee appointed will act in conjunction with a similar one appointed by the architects.

The meeting was concluded with a paper on "Co-efficients in Hydraulic Formulæ determined by Measurements of Flow in the Desplaines River Diversion made by the Sanitary District," presented by Mr. W. J. Keating.

PERSONAL.

—Mr. F. W. Boye, Jr., First Assistant Treasurer of the Cleveland, Cincinnati, Chicago & St. Louis, in Cincinnati, has resigned.

—Mr. N. J. Power, lately General Passenger Agent of the Grand Trunk, has been appointed Auditor of Disbursements of that system.

—Mr. Thomas Q. Barbour, Secretary and Treasurer of the Cheasapeake & Ohio road, died at Indianapolis on Tuesday of last week from a stroke of paralysis.

—Mr. Miguel C. Palmer, C. E., lately of Havana, has been appointed American representative of the *Railroad Gazette of Cuba*, having removed to Bogota, N. J.

—Mr. F. L. Pomeroy, who was formerly General Freight Agent of the Erie road years ago, is to succeed James W. Musson as Manager of the Nickel Plate fast freight line.

—Mr. John Bradshaw, Lumber Purchasing Agent of the Baltimore & Ohio, one of the oldest officers of that company, has retired from its service and will return to his residence near Grafton, W. Va.

—Mr. Albert P. Lewis, Auditor of the Indianapolis, Decatur & Western road, died at his home in Indianapolis, on April 3, of congestion of the brain. Mr. Lewis had been Auditor of this road for years.

—Mr. M. Sweeney has been appointed Acting Superintendent of the Choctaw, Cherokee and Kansas City division of the Missouri, Kansas & Texas, vice Mr. L. W. Welch, granted an extended leave of absence.

—Mr. Joseph K. Long, has resigned his position in the Juniata shops of the Pennsylvania to accept the General Foremanship of the Blacksmith Department of the Western New York & Pennsylvania at Buffalo, N. Y.

—Mr. James W. Musson, Manager of the Nickel Plate Fast Freight Line, has resigned to take effect on April 15. He will then go to New York City, where it is expected that he will take another position with the company.

—Mr. George T. Jarvis has resigned his position as Assistant General Superintendent of the Lake Erie & Western. He will assume his new office as Receiver of the Louisville, Evansville & St. Louis lines east of Mt. Vernon on May 1.

—Mr. Willis C. Lee, Assistant Foreman of the Frog, Switch and Signal Department of the Pennsylvania Steel Works, will become General Manager and Superintendent of the Marden Frog and Crossing Works, Chicago, Ill., April 22.

—Major A. H. Johnson, Engineer of Maintenance of Way of the Baltimore & Ohio, whose resignation from that office was announced last week, has been granted a leave of absence until July 1 next. The office which he has held will be consolidated with that of the Chief Engineer.

—Mr William J. Long, roadmaster of the southern district of the Michigan Division of the "Big Four," has been appointed Superintendent of Terminals of the company at Louisville, Ky., his jurisdiction to include the bridge across the Ohio River between Louisville and Jeffersonville.

—A dispatch from Fort Worth, Tex., announces that B. F. Yoakum, General Manager and Vice-President of the Gulf, Colorado & Santa Fe, has been offered the Presidency of the Houston, East & West Texas, and says he has the matter under consideration. The acceptance of the office would not affect his connection with the Gulf, Colorado & Santa Fe.

—Maj. Joseph G Pangborn, President of the World Transportation Commission of the Field Columbian Museum, Chicago, arrived in New York last week, after being abroad a year and a half with the Commission. The party have traveled a distance of 60,000 miles. During their tour the Commission visited Europe, Asia, Australia and the northern part of Africa, and they propose to go to South Africa, as well as South America. Major Pangborn expects to sail for Liverpool again on April 29.

—Mr. R. H. L'Hommedieu, the new General Superintendent of the Michigan Central, is about 46 years of age and has been Assistant General Superintendent since 1890, when Mr. Robert Miller became General Superintendent of the road. He has been with the Michigan Central 22 years, beginning as a clerk under the General Superintendent. After serving as Trainmaster he was Division Superintendent at Chicago for 11 years, until his appointment as assistant to the General Superintendent.

—Mr. Robert Miller, General Superintendent of the Michigan Central, is hereafter to be Superintendent of Motive Power and Equipment, a new office. The former Assistant General Superintendent, Mr. R. H. L'Hommedieu, becomes Mr. Miller's successor as General Superintendent. Mr. Miller in taking charge of the mechanical department of the Michigan Central resumes his connection with a line of work with which his first railroad experience was had and in the department with which he began his connection with the Michigan Central. His first position on that road was as Master Car Builder, with charge also of buildings and water works, in June, 1876. It was not until 1884 that he was transferred to the transportation department, becoming in that year Assistant General Superintendent, and holding the office six years.

—Mr. Morton E. Davis, who recently resigned the position of General Manager of the New Jersey Electric Railway, has had a long and valuable experience in the operating department of steam roads. He began as freight brakeman on the Wisconsin division of the Chicago & Northwestern in the fall of 1863, and served several roads as conductor and in charge of men on construction. In 1889 he was appointed General Yardmaster of the Northern Pacific in charge of the Fargo, Morehead & Jimtown (Dakota) yard, and in May, 1893, took charge of the World's Fair terminals of the Illinois Central, in which very difficult position he made a remarkable record, finishing without an accident. Later he became General Manager of the New Jersey Electric road in September, 1895. This road extends from Hoboken to Little Falls, controlling 36 miles of track.

—Mr. C. M. Higginson, for many years connected with the Chicago, Burlington & Quincy, has been appointed Assistant to the President of the Atchison, Topeka & Santa Fe. This position is, presumably, similar to that which Mr. Higginson has held in the office of the Second Vice-President of the Burlington, where he did original work in establishing and maintaining uniformity among similar departments on different divisions of the very widely scattered Burlington system, and economical co-operation between different departments, whether close together or far apart, territorially. In this field Mr. Higginson has made an enviable record, being an influential actor in the work of effecting important economies which have been an important element in preserving financial solvency during the hard times. He is a civil engineer, and has had large experience also in the locomotive department. To this training he added a term of service in the accounting department, thus qualifying himself, to a degree quite unusual, for a supervisory position like that which he holds. Mr. Higginson is prominent in the Western Railway Club, and has been a frequent writer in the *Railroad Gazette* and other technical journals.

—Mr. William L. Darling, whose appointment as Chief Engineer of the Northern Pacific was noted in this column this week, has been for some years past Division Engineer at St. Paul. He has been connected with this company since 1879, his first service being as Assistant Engineer on the construction of the road in Western Dakota and Montana. He was connected with the engineering department of the road from that time until the completion of the construction of the main line and branches with the exception of about two years when he was Chief Engineer of the Duluth, Watertown & Pacific road in Dakota and of a road in Florida. He has had charge of very important engineering work on the Northern Pacific, including the location and construction of the difficult line through the Cœur d'Alene Mountains in Idaho and of the line between Little Falls and Staples, Minn. Since the completion of the construction work he has been Division Engineer in charge of maintenance of way between St. Paul and Billings, Mont. Mr. Darling was born in Massachusetts and was graduated from the Worcester Polytecnic Institute, being now about 36 years old. He was elected a member of the American Society of Civil Engineers in 1892.

ELECTIONS AND APPOINTMENTS.

Altoona & Phillipsburgh Connecting.—Henry Levis, of Philadelphia, a director of the company, has been elected President to succeed S. P. Langdon.

Atchison, Topeka & Santa Fe.—C. M. Higginson has been appointed Assistant to the President, with office at Chicago. Mr. Higginson will have immediate supervision of all coal properties in which this company is interested, and will perform such other duties as may be assigned to him by the President.

Central of St Joseph.—The directors of this new company are as follows: F. Enderbrock, W. B. Johnson, J. Francis Smith, W. M. Rush, Jr., Silas H. Sommers, J. W. Brockett, John Townsend, D. McDonald, J. W. Boyd, R. M. Davis, R. H. Faucett and John F. Tyler, all of St. Joseph, Mo.

Chicago & Alton.—The stockholders of the railroad held their thirty-third annual meeting on April 6, at Chicago. Charles H. Chappell, Vice-President and General Manager, was elected a director. This was the only change in the directory, and the former officers were re-elected at the meeting of the directors.

Choctaw, Oklahoma & Gulf.—Mr. F. A. Molitor has been appointed Engineer of Maintenance of Way of the road, with office at Shawnee, I. T.

Erie.—John Roach, lately Roadmaster of the Cleveland, Akron & Columbus, has been appointed Roadmaster of the New York Division of the Erie road, with headquarters in Jersey City.

Georgia Midland.—The directors of this company, which succeeds the Georgia Midland & Gulf, are as follows: R. A. Lancaster and William H Palmer, of Richmond; G. Jordan, of Columbus; George Sherin, of New York, and John F. Flourney, Seaton Grantland, Chas L. Davis, A. Illgess, R. A. Lucke and J. H. Archer.

Grand Trunk.—The extension of the jurisdiction of the general traffic officers at Montreal, over the entire line, was noted last week. The jurisdiction of the following officers has been similarly extended: F. H. McGuigan, General Superintendant; Joseph Hobson, Chief Engineer, and Herbert Wallis, Mechanical Superintendent.

Houston & Texas Central.—At the annual meeting of the stockholders held in Houston, Tex., last week, the following officers were elected: President, Thomas H. Hubbard, of New York; Vice-President, G. A. Quinlan, of Houston; Secretary and Treasurer, E. W. Cave, of Houston: Assistant Secretary and Treasurer, I. E. Gates, of New York; Directors, Thomas H. Hubbard, I. E. Gates, J. Kruttschintt, G. A. Quinlan, T. W. House, A. P. Root, C. W. Beln, J. M. Lee and E. W. Cave.

Lehigh Coal & Navigation Co.—Lewis A. Riley has been elected President of the company in place of Calvin Pardee. The new President is a civil and mining engineer and senior member of the coal mining firm of Lewis A. Riley & Co., of Philadelphia.

Lehigh Valley.—C. C. Rosenberg has been appointed Signal Engineer in charge of all the interlocking and mechanical signals. His headquarters will be at Philipsburg, N. Y.

Panama.—At the annual meeting of stockholders of the company, on April 6, the old Board of Directors was re-elected, except that Robert M. Gallaway and E. Lawrence Hopkins succeed John Newton, deceased, and E. L. Oppenheim. These officers were chosen: President, J. Edward Simmons; Vice-President, George Whaley; Secretary, E. A. Drake, and Treasurer, S. Deming.

Pueblo, Cripple Creek & Victor—The Directors of the proposed railroad held a meeting at Pueblo, Col., on March 31 and the following officers were chosen: W. W. Allen, President; A. T. King, Vice-President; Paul Wilson, Secretary; C. Wilson, Treasurer.

St. Louis, Chicago & St. Paul.—Receivers Dickson and Kimball announce that Henry W. Gays, heretofore Traffic Manager, has been made General Manager. General Superintendent I. W. Fowler having resigned, the office has been abolished. G. W. Galligan has been appointed Assistant General Freight Agent, with office at St. Louis, and E. A. Williams appointed Assistant General Passenger Agent, also with office at St. Louis. W. S. Cooke becomes Superintendent, with office at Springfield, Ill.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

Atlantic, Suwanee River & Gulf.—The company is pushing work on the Worthington Springs branch with a large force. The branch starts from the main line two miles west of Talerosse, Fla., and proceeds in a direct line to Worthington Springs, a distance of about 12 miles. Eight miles of the road has been graded.

Bellefonte Central.—Arrangements are being made looking to the extension of this road from its present terminus at State College into Huntingdon County, Pa., where a connection will be made with the Huntingdon & Broad Top. The road is already graded to Pine Grove Mills, and the track will be put down as soon as the weather will permit. The entire extension will be about 50 miles. Robert Frazer, of Philadelphia, is President.

Camden & Atlantic.—It is said that this road is likely to be double-tracked during the summer the entire distance from Haddonfield to the Atlantic coast, 50 miles. The trains crossing the Delaware River by the new bridge of the Pennsylvania, which is about completed, reach the tracks of the Camden & Atlantic at Haddonfield, and it is on account of the extra traffic which will go over the road by the use of this bridge that the second track is to be built. A second track is now built only from Camden to Haddonfield.

Central of St. Joseph.—This company was incorporated in Missouri last week to build a railroad 90 miles long from the southern limits of St. Joseph through the counties of Buchanan, Andrew, De Kalb, Gentry, Davis, Harrison and Grundy to the City of Trenton. The stockholders include James W. Boyd, J. W. Brackett, John A. Duncan, John Townsend, all of St. Joseph, Mo.

Cincinnati, Jackson & Mackinaw.—The tracklaying on the northern extension of this road is now making good progress, and it is thought that this work can be completed within three weeks. The distance by the new line is 18 miles from Addison Junction, the present northern terminus of the road, into Jackson, Mich. The last contract work has been done by George M. Huss, of Chicago.

Esquimalt & Naraimio.—The owners of this road have agreed to extend the line through Vancouver Island for a distance of 100 miles above Wellington, its present terminus, provided the city of Victoria guarantees bonds of the road to the amount of $2,000,000 at 4 per cent. for 25 years.

Fort Smith & Western.—This company has begun work grading the road from the coal mines at Pocola, I. T., to the St. Louis & San Francisco, a distance of several miles. The work will be pushed until this division is completed. The company was incorporated last January to build a road 80 miles in length, southwest of Fort Smith, Ark. E. J. Crandall, of Fort Smith, is a director.

Georgia Midland.—A charter for this road was filed at Atlanta, Ga., last week, the company being the successor of the Georgia Midland & Gulf, recently sold at foreclosure. The incorporators include G. Gunby Jordan, President of the company, and the members of the purchasing committee. The road extends from Columbus to McDonough, Ga., 110 miles. There is some talk of the road being extended to Atlanta, Ga.

Lehigh Valley.—Mayor Allison has signed the ordinances granting the company the right to extend its tracks in the western part of Allentown from the terminus of the branch in and along Scott street to a terminus between Twelfth and Seventeenth streets and Gordon and Liberty. The company agrees to build a bridge at the northern terminus of Seventh street to Whitehall Township.

Monroe, Dundee & Lake Erie.—This company was incorporated in Michigan last week by W. L. Johnson, Vincent Field and Oscar Marks, of Monroe, Mich. No particulars of the proposed road are given.

New Roads.—C. A. Ross, of Kansas City, has proposed to the townspeople of Columbia, Mo., to build a road from that city south to the Missouri River, connecting with the St. Louis line of the Missouri, Kansas & Texas, if local subscriptions amounting to $25,000 can be secured at Columbia. That town is now the terminus of a short branch of the Wabash road, which enters it from the north.

R. H. Black, of Gilsonburg, O., andothers interested in the oil regions of Ohio, are, it is reported, organizing a company to build a railroad from Fremont to Wauseon through Gilsonburg and Bowling Green, reaching the oil districts in the state.

Port Jervis, Monticello & New York.—Engineer Irving Righter has completed the survey of the proposed extension of the road from Monticello to White Lake, N. Y. The distance is about 11 miles. The building of the road is dependent upon the company's securing free right of way.

St. Louis, Vandalia & Terre Haute.—Right of way across a swamp between St. Joseph and Benton Harbor, Mich., has been given to this company by the property owners for an extension of its road across this land into Benton Harbor. This will necessitate the construction of a line one-third of a mile long. The present line of the Vandalia between these two towns is about two miles long on account of the detour which is made to avoid the swamp.

San Francisco & San Joaquin Valley.—The directors of this company last week notified subscribers to the capital stock that an additional 10 per cent. on their subscriptions to the company's stock was payable. This is the fifth call of like amount, and it is stated that there was no default of any amount in the payments due. Just half of the stock issued, $1,220,000, has now been paid in. The construction work has now been completed south of Stockton to near Merced, to which it is expected to complete the tracklaying by May 1, and the road has been located as far as Bakersfield, 250 miles south of Stockton. Construction material has been received to complete the road as far as Fresno, which point it is expected to reach about Aug. 1, when the entire line to that point will be opened for traffic. The long bridges over the Stanislaus and Tuolumne rivers have been completed and bridge gangs are now working on the long bridge across the Merced River north of the town of Merced. About 35 miles of track have been completed south of Stockton. Grant Brothers are grading the road into Merced, building about a mile of road daily.

Southern.—It is reported that the company proposes to build into the country near Southern Pines and Fayetteville, N. C, by building a short link connecting Asheboro' and Starr, the latter place being on a branch of the Aberdeen & West End, a short local road.

Union City, Richmond & Lawrenceburg.—Articles of incorporation for this company were filed in Indiana last week. The company is to build from Union City, Randolph County, to Lawrenceburg, Dearborn County, Ind. The road will be 80 miles long, and will cross the counties of Randolph, Wayne, Union, Franklin and Dearborn. The incorporators are Charles A. Mackey, W. M. Page, Oscar E. Evans, James W. Rowland, Joseph H. Shoemaker, Henry C. Zeigler, Wesley C. Hawe, Eugene G. Palmer and Hiram Tewkesbury.

West Jersey.—Construction work will probably begin early this month on a branch of this Pennsylvania line from May's Landing to Ocean City, N. J., on the Atlantic Coast. This will make the distance from Camden to Ocean City 61.7 miles, but three miles longer than the line from Camden to Atlantic City. There is a sharp competition between the Philadelphia & Reading and the Pennsylvania for the seashore traffic from Philadelphia to both these points. The Reading reaches Atlantic City over its own line, the Atlantic City Railroad, but uses the South Jersey track to points on the coast below that point. The latter company, a few weeks ago, decided to build a line to Ocean City by which the distance from Camden will be 63.9 miles, but the Pennsylvania's new line will be 2.2 miles shorter. The surveys and estimates for the new branch have been completed and the contract is likely to be given out within a few days. The road will leave the main land at Somer's Point and cross Great Egg Harbor Bay to Ocean City by a trestle bridge about two miles long. Three draws will be necessary in the trestle to permit the passage of the small boats used on the bay.

West Side Belt (Pittsburgh).—Engineer J. H. McRoberts of this road which is to run from Pittsburgh to Monongahela, states that work securing right of way was progressing well and that the work of construction will probably begin by May 1 and the line be completed to Castle Shannon by November 1. The route will be via Sawmill run and over the West End line to Pittsburgh. The aim is to make it both a freight and passenger road.

Electric Railroad Construction.

Annapolis, Md.—The bill incorporating the Baltimore, Chesapeake & Western Railroad Co. has been passed by the House. This bill permits the company to build in most of the western and southern counties in the state and also in a few on the Eastern Shore.

Baltimore, Md.—E. D. Smith & Son, contractors, of Philadelphia, have filed a bill asking that a receiver be appointed for the Baltimore & Catonsville Construction Co. on alleged default of payment for $110,630.63 for construction work. Some time ago the company brought suit against the contractors for $150,000 damages for alleged failure to comply with the contract. The subcontractors, under Smith & Son, have been retained by the construction company, and they are doing the work on the line.

Belmar, N. J.—An electric railroad has been incorporated to extend from Belmar to Spring Lake and Manasquam. The capital stock is $50,000, and A. B. Wilbur, Jr., is President.

Brooklyn.—The rails for the extension of the Nassau system to Fort Hamilton and Bath Beach are being distributed. They are 60 ft. long and weigh 100 lbs. to the yard.

The work of connecting the Kings County Elevated with the Brighton Beach Railroad will be begun at once, and it is expected it will be finished by June 1. This will enable cars to run direct from the New York and Brooklyn Bridge to Coney Island. The Phœnix Bridge Co. has been given the contract for the elevated portion of the work.

Derry, N. H.—Work on the electric railroad will be begun April 15 and cars will be run by July 4. The ties and poles are already distributed, and the rails have been ordered. The General Electric Co. will provide the electrical equipment.

Erie, Pa.—F. G. & G. R. Sikes, of Buffalo, have the contract for building an electric railroad from Erie to North East, Pa. Work will be begun in May.

Hackensack, N. J.—The Northern New Jersey Construction Co. has been formed, with a capital of $100,000, to build an electric railroad from Carlstadt to Park Ridge by way of Hackensack. It is said that Justice W. B. Smith is interested in the company.

Haverhill, Mass.—The Haverhill, Georgetown & Danvers Street Railroad Co. has increased its capital stock to $60,000, and will probably soon build its road to Georgetown.

Jacksonville, Fla.—An ordinance has been introduced allowing the Pensacola Terminal Co. to extend its lines and to substitute electricity for horse power.

Munroe, Mich.—The Monroe, Dundee & Lake Erie Railway Co., which has been recently incorporated, was granted a franchise through Dundee last week.

New York.—The Kings County Traction Co. has been incorporated, with a capital of $6,000, to carry on a street and other railroad construction business, with principal office in New York city. Some of the directors are P. F. Vaughan and J. F. Lockman, of Brooklyn; and Emil Carlebach, J. A. Snyder and George H. Levy, of New York city.

Oregon, Mo.—The Oregon & Forest City Railway, Light and Power Co. has been organized to build an electric railroad 3¾ miles long between Oregon and Forest City. The cost is estimated at $70,000. S. C. Douglas is President.

Palmer, Mass.—A company has been formed to build an electric railroad from Palmer to Monson, a distance of four miles.

Petersburg, Va.—The Petersburg Street Railway Co. has decided to enlarge the plant and build a handsome and larger depot at Second and River streets. Architect Harrison Waite has been employed to draw up plans and specifications of the work to be done, and will furnish further information.

Portland, Ore.—The Portland Traction Co. will substitute electricity for the cable now used, and is making the necessary alterations for the change.

Portsmouth, Va.—The Portsmouth Electric Street Railway Co. has decided to extend its road to the new Athletic Park in the suburbs of Portsmouth, near the navy yard. The extension will be built at once.

Santa Ana, Cal.—Frank Ely has asked the Board of Trustees for a franchise to build a street railroad from Santa Anita to Orange, also on Fifth and Sixth streets to the railroad stations.

Sing Sing, N. Y.—Arrangements have been completed for the extension of the electric railroad from this village via Pleasantville and Sherman Park to Unionville. Work will be begun in a week, and the road will probably be in operation in six months.

Springfield, Mass.—The Street Railroad Co. has placed a contract for two general electric generators of 1,000 H. P. each, and two Hamilton-Corliss 1,200 H. P. engines to run them.

Tarrytown, N. Y.—The application of the Tarrytown Electric Railway Co. for a certificate of incorporation has been refused by the Railroad Commissioners. The company intended to build a road from Tarrytown to Elmsford, and the refusal was made, not because a road between the towns was not desirable, but because the company had chosen a route not convenient for the public. Moreover, the New York, Elmsford & White Plains Railroad Co. has applied to the local authorities for permission, which has been granted, to extend its road from Elmsford to Tarrytown on the route desired by the people.

Warren, Mass.—A company has been organized to build an electric road between Ware, Gilbertville and Warren. T. L. Currier, of Worcester, is President, and H. M. Clark, of Ware, Secretary. The road will be about ten miles long.

Waterloo, Ia.—It is stated that $150,000 and $57,000 worth of real estate will be invested in an electric railroad from Waterloo to Cedar Falls, a distance of seven miles.

Wooster, O.—The proposed road from Wooster to Cleveland, passing through Akron and Wadsworth, has been surveyed. It begins in the coal fields and it is expected it will have a large coal business besides carrying dairy supplies, merchandise, mails and passengers. F. G. McCauley is President and F. C. Lee, Secretary, both of Wadsworth.

GENERAL RAILROAD NEWS.

Canadian Pacific.—At the annual meeting of the shareholders at Toronto, April 1, the agreement between the Canadian Pacific and the New York Central, the Michigan Central and the Toronto, Hamilton & Buffalo companies for the completion and joint control of the railroad of the last-named company was approved. This agreement is to secure a connection with Hamilton, Brantford and Niagara. The annual report, however, has this paragraph: In this connection, negotiations are pending for the joint use by your company of the Grand Trunk line between Toronto and Hamilton, with the object of rendering unnecessary the construction of the Hamilton-Toronto section of the Toronto, Hamilton & Buffalo road, and there is good reason to hope this is an arrangement which, in the interest of all concerned, will be consummated, and in view of this you will be asked to authorize the directors to make such an agreement with the Grand Trunk Company for a lease of running powers and other privileges between the cities named as may seem desirable. Resolutions authorizing the directors to conclude this agreement were passed at the meeting.

Cape Fear & Yadkin Valley.—Judge Simonton of the United States Circuit Court has decided the foreclosure case of this company in favor of the Baltimore Reorganization Committee whose plan provides that the property be sold as a whole, and not in divisions or sections as was desired by the New York Reorganization Committee which represented large holdings of the "A" bonds.

Detroit, Lansing & Northern.—Charles M. Heald, General Manager of this road, was appointed receiver of the property at Grand Rapids, Mich., last week. This action was taken to facilitate the reorganization of the company under the plan described in this column within a few weeks. It is hoped that this reorganization can be carried out within six months.

Erie.—The New York & Greenwood Lake Railroad and the Orange branch have been absorbed by the Erie

Railroad, the latter having taken a lease for 99 years. The Greenwood Lake road, from Jersey City to Montclair Heights, will be double tracked. Work will be begun at once, and it will be pushed forward as rapidly as possible.

The earnings for February are as follows:

	1895.	1896.	Inc
Gross earn....	$1,970,215	$2,122,078	$151,863
Working exp....	1,652,886	1,730,224	77,338
Net earn....	$317,329	$391,854	$74,525

Included in the expenses of 1896 is one-twelfth of the entire taxes of the year.

Grand Trunk.—The report for the half year ending April 1 statesthat the gross receipts for the period named increased £29,881, and the working expenses increased £40,689. The net traffic receipts decreased £10,808. The net revenue receipts were £634,252, and the net deficit is £33,151, making an aggregate debit balance of £224,707. This debit balance is caused largely by amounts advanced to the Chicago and Detroit sections. The Grand Trunk proper shows a net profit of £58,771. In its report the Board says there is every indication since the beginning of the year of a substantial improvement in the Chicago line.

Green Bay, Winona & St. Paul.—An order was made in the United States Circuit Court of Appeals at Chicago, permitting the sale of the road to proceed. The road had been ordered sold by Judge Seaman of Wisconsin, and a holder of $105,000 of the first mortgage bonds, appled for a supersedeas. The arguments were heard at Chicago on April 7, and the court directed that the road be sold and the amount of the claim be set aside until the contention is heard at the next term of the court.

Hendersonville & Brevard.—The question of the appointment of a Receiver for this road in North Carolina came up before the Superior Court of North Carolina last week, but by consent of all parties argument was postponed, and the case was set for a final hearing at the May term. This is a new road, and has been in operation less than a year. The management hopes to avoid the necessity of the appointment of a Receiver.

Jacksonville, Tampa & Key West.—The sale of the road, which was to have taken place on April 6 under a decree of foreclosure made by the United States Court in favor of the second mortgage bondholders, has been postponed until May 4, on petition of the complainants in the suit brought by the American Construction Co. against the railroad company. When sold, the road must bring $350,000 to pay receivers' certificates and other claims having priority to the bonds.

Macon & Birmingham.—The final payment of $100,000 was paid into the Superior Court, at Macon, Ga., on March 30 last and a deed of conveyance to F. M. Edwards and B. C. Parsons of Boston, was issued by the court. The names of the real purchasers of the property do not appear from the records, and the court refused to compel the attorney to reveal the names. Presumbly they are the holders of the $1,160,000 of the first mortgage bonds.

Meriden, Waterbury & Connecticut River.—The bondholders have begun a suit for the foreclosure of the first mortgage for $400,000. A decree for the sale of the property was granted by the Superior Court at New Haven on April 4. The sale is to take place in May. The mortgage was executed in 1892. The bonds are now all held by the New England Railroad.

Mexican National.—A plan for the reorganization of the company has been formulated in England, some particulars of which were published in this country last week. It is proposed to form an English company to be called the Mexican National Railroad Company, Limited, with power to issue about £2,000,000 of ordinary stock, into which the "B" bonds may be converted, £2,500,000 of 5 per cent. preference stock to be given for "A" bonds, and a sufficient quantity of debenture stock bearing 4 per cent. or 4½ per cent. interest, for the purpose of replacing, if deemed advisable, the existing prior lien bonds and for further capital outlay. The present holders of the second mortgage "A" bonds will receive in exchange for their bonds and overdue and unpaid coupons new 5 per cent. preferred non-cumulative stock, on a basis of par in preferred stock, for the principal of the bonds and 50 per cent. of the overdue interest. The present holders of second mortgage "B" bonds will be given ordinary capital stock of the new company. The object of the plan is to make the "A" and "B" bonds more readily marketable than they can be at present, with their large arrears of interest; to give a more immediate and practical control, and to shape matters so that it may be possible in the future to refund the prior lien bonds at a lower rate of interest.

Old Colony.—The Massachusetts Railroad Commissioners have approved an issue by the Old Colony of $250,000 in bonds, to run for 30 years at 4 per cent., to take up an issue of 6 per cent. bonds which comes due next September.

Panama.—The annual report for the year ending Dec. 31, 1895, shows earnings and expenses as follows:

	1895.	1894.	Inc. or Dec.
Gross earn....	$1,311,635	$1,056,584	I. $255,401
Oper. exp....	1,153,577	953,392	I. 200,185
Net earn....	$158,058	$103,142	I. $54,916
Other receipts....	394,805	306,822	I. 87,983
Total income....	$552,863	$409,964	I. $142,899
Charges....	489,919	490,739	D. 820
Surplus....	$62,944 (def)	$80,755	I. $143,719

The condensed balance sheet of Dec. 31, shows a reduction of surplus amounting to $240,013, caused by the readjustment of certain accounts. In order to secure a better lighterage system it has been decided to construct a deep-water terminal in Panama Bay at La Boca.

Peoria, Decatur & Evansville.—The Receivers of the company report the following results of operation for the year ended Dec. 23:

	1895.	1894.	Inc. or Dec.
Gross earn....	$911,776	$860,998	I. $50,778
Expen....	618,610	651,878	D. 33,268
Net earn....	$293,166	$209,120	I. $84,046
Other receipts....	15,000	.....	I. 15,000
Total income....	$308,166	$209,120	I. $99,046
Fixed charges....	250,064	202,285	D. 2,121
Surplus....	$58,102 (def.)	$13,065	I. $101,167

St. Louis, Alton & Terre Haute.—It was announced last week that arrangements had been completed by which all of the properties of this company had been leased to the Illinois Central for 90 years from Oct. 1, 1895, the Illinois Central guaranteeing a dividend of 2¼ per cent. per annum to the stockholders of the leased company. The first dividend payment will be due July 1, 1896. In a circular to the stockholders of the St. Louis, Alton & Terre Haute, explaining the circumstances of tnis agreement, President Parker says: "It is known to the most of you that for about 25 years the Illinois Central has maintained close traffic relations with this company, and that all of its business from the South to and from St. Louis has been handled over the lines and terminals of this company. The time had come, your officers learned, when the Illinois Central Railroad deemed it to its best interest to control its own entrance into St Louis. It seemed to your directors prudent and proper, and as well necessary, to negotiate for a lease of your property to that company, provided suitable terms could be arranged. After patient labor in this matter, your directors are now able to notify you that they have, with the written approval and consent of a majority of the stockholders, completed and duly executed the said lease."

The Belleville & Southern Railroad which for 25 years has been a connecting link between the St. Louis, Alton & Terre Haute and the Illinois Central, is included in this arrangement, inasmuch as it is leased in perpetuity to the Alton & Terre Haute. The Illinois Central is to pay the preferred stockholders a fixed rental of 4.80 per cent. a year.

St. Louis, Cape Girardeau & Fort Smith.—The bondholders' committee has approved a 50-year contract with the St. Louis Southwestern, giving the latter company trackage rights from Delta to Cape Girardeau, Mo., and the use of terminals at Cape Girardeau. The 15 miles of road will be relaid with new rails, and the terminal facilities will be improved, the Receiver being authorized to issue for this purpose $50,000 of certificates. The foreclosure sale, it is thought, will occur during the summer. It has been delayed on account of litigation over claims of creditors amounting to about $150,000.

Seattle, Lake Shore & Eastern.—Judge Hanford granted an order at Seattle, Wash., on March 31, for the sale of the road on May 16 next at Seattle. The bondholders, under the reorganization plan, will be bidders for the property.

Electric Railroad News.

Brooklyn.—The final consolidation of the Nassau Electric Railroad Co. and the Atlantic Avenue Railroad Co. has been made, and the Nassau Co. assumed full control last Saturday night. The new branch from the Union station to Fort Hamilton has been opened, and will be extended to Bath Beach and Bensonhurst before long.

Kansas City, Mo.—The Metropolitan Street Railway Co. has completed plans for a new power station. The building will be 145 ft. × 126 ft. and the equivalent of three stories in height. The plant will be of 5,000 H. P. capacity, and it is said will cost about $300,000.

Montgomery, Ala.—The West End & Riverside Electric Railroad Co. has been purchased by a new corporation, the Montgomery Suburban Street Railway Co., which proposes to extend the line beyond the suburbs. Alexander Troy is President and George B. Shellhorn Secretary and Manager.

Pittsburgh, Pa.—The combination of a number of street railroads in Pittsburgh and Allegheny, which was arranged the first of the year, has finally gone into effect and the new company, the Consolidated Traction Co., has assumed the control of the lines. The companies which have been consolidated are the Pittsburgh Traction, the Duquesne Traction, the Central Traction, the Allegheny Traction, the Citizens Traction and the Fort Pitt Traction. The capital of the company is $25,000,000, of which $15,000,000 is common and $10,000,000 preferred stock. It is the intention to spend $4,000,000 at once on improvements. C. L. Magee, of Pittsburgh, is President.

Tiffin, O.—The Tiffin Electric Street Railroad will be sold at auction on April 13. The road is appraised at $12,000.

Yonkers, N. Y.—A certificate of consolidation of the Yonkers Railway Co., the North & South Electric Co., and the Yonkers & Tarrytown Electric Railroad Co. was filed with the Secretary of State last week. The name of the new corporation is the Yonkers Railroad Co. and the capital stock is $1,000,000. Among the directors are: Albert L. Johnson, John H. Ingram, and M. C. Wilson, of New York City; J. F. Van Name, and Albert Crolius, of Brooklyn, and Channing Burnz, of Scarsdale. The company's principal office will be in Yonkers.

TRAFFIC.

Traffic Notes.

The Atchison, Topeka & Santa Fe has decided to discontinue the fast limited California train, the traffic being considered too light during the summer to warrant the expense. The train will, however, run through from Chicago once a week.

The United States District Attorney, acting on behalf of the Interstate Commerce Commission, has applied to the Circuit Court at Denver to enforce the order of the Commission in the matter of rates on rails and other steel products from Colorado to California points. The order of the Commission in this case was reported in the *Railroad Gazette* of Dec. 20 and Jan. 10.

The reorganization of the Transcontinental Association was completed in Milwaukee April 4. R. H. Countess, of Chicago, was elected permanent Chairman, and James Fuller, General Eastern Agent, with headquarters in New York. It is asserted that all of the lines that were in the old Transcontinental Association have expressed approval of the new agreement.

The Georgia State Railroad Commission has sent notices to the Southern, the Central, the Georgia Southern & Florida and the Macon & Northern Railroads, citing them to show cause why they should not be put under the operation of the commission's rule requiring all railroads under a single management or control to be considered as constituting one and the same road, the rates to be computed as upon parts of the same road.

Following the Great Northern, the Northern Pacific will improve its passenger train service between St. Paul and the Pacific coast. Two trains will be run daily each way instead of one as now. The time between St. Paul and Tacoma will be shortened eight hours. The time eastbound will be shortened six hours. The Burlington road will quicken the time of its trains to and from Billings, Mont., so as to connect with the new trains of the Northern Pacific.

The Railroad Commissioners of South Carolina have an extensive job on their hands. The law recently passed in that state, reducing the passenger fares on all railroads, has a proviso giving the Commissioners authority to make modifications, and they held a conference with the officers of the principal railroads last week. The railroad men did not want much; they wanted time to make tariffs, a continuance of the present rates on most of their lines, a regulation that they need not make rates closer than an even five cents, a minimum of 10 or 15 cents, and special rates of four cents a mile in some cases. The Commissioners "took the matter under advisement."

The Managers of the Joint Traffic Association have modified section 2 of article 2, which excludes coal, ore, etc., from the control of the Association, and have assumed jurisdiction over limestone except when it is destined to blast furnaces. The Board has allowed the Grand Trunk and Canadian Pacific to quote the same rates on westbound import traffic as prevail on rail and lake lines. This concession is made in order to pacify the two companies, but is accompanied by certain conditions, one of which is that a report must be filed regularly of the tonnage moved by both lines. This would indicate that the Canadian Pacific is working with the Association. The Board has also extended the territorial lines of competition for the Chesapeake & Ohio with the Norfolk & Western, and West Virginia points are included.

Southwestern Traffic Association.

Executive officers of the railroad and steamship lines interested in this association met at St. Louis, April 6, and adopted an agreement for the maintenance of rates and the division of competitive traffic. The agreement is modeled closely upon that of the now famous Joint Traffic Association. It provides for a Board of Administration and an Executive Board. L. F. Day was elected Commissioner and Chairman.

Chicago Traffic Matters.

CHICAGO, April 8, 1896.

The Supreme Court decision in the Brown case has done more to strengthen the rate situation at Chicago than any agreement that was ever entered into. Criticism of the decision has entirely ceased and traffic officers are falling over each other in their efforts to stop every leak. To guard against any possible infraction of the law confidential letters have been sent to the agents of some roads warning them of the consequences of rate-cutting. It is gradually dawning upon the officers of big and little roads that the decision is going to greatly benefit the railroads. James F. Marchand, an agent of the Interstate Commerce Commission, has been in Chicago during the past week investigating cut rate reports. He held a long conference with Chairman Midgley, of the Western Freight Association, but it is said he discovered nothing of an incriminating nature. The Western roads have withdrawn their two cent theatrical rate. When the ten-ride party tickets were withdrawn, most of the roads, by a "verbal understanding," continued to give theatrical companies the party rate. Now they see the law more clearly.

Lake traffic during the coming season promises to be heavier than for any previous year, unless the advanced lake and rail rate has a more dampening effect than is now anticipated. Navigation has opened and vesselmen are looking forward to a prosperous year. Vessels have been loading for several weeks, and there have been many clearances since April 1. By reason of the warm weather corn is now coming to Chicago instead of seeking the Gulf ports. The advancing of rail rates to the Southern ports will send much grain to the Lakes, but the weather will turn the current more than the rates. The elevators in Chicago and near-by points are full, and more corn is likely to be shipped out of this city this summer than in any preceding season. The experience in the past has been that when corn can be put on board vessels in Chicago at 40 cents there was a demand for an immense quantity of it abroad. It is now about 30 cents and the demand ought to be correspondingly increased. Managers of the Eastbound rail lines out of Chicago have great confidence in the lake and rail agreement, and believe that lake and rail rates will be firmly maintained during the coming season. The port of South Chicago is rapidly coming to the front and is destined to be the lake shipping center of Chicago.

The elevator problem in Chicago is one point nearer solution. The Michigan Central gives notice that it has leased its new transfer grain elevator at Kensington to Mr. W. A. Walker, who will run it entirely separate and distinct from the Michigan Central Road. The elevator will have a capacity of 150 carloads a day.

The trial of ex-President J. W. Reinhart, and ex-Traffic Manager J. A. Hanley, of the Santa Fe, for giving illegal rates to certain cattle shippers, has been set for May 18, in the United States District Court in Chicago. This trial promises to lay bare the inside workings of the old Santa Fe management as the witnesses will now be forced to tell all they know.

Western lines are troubled over the announced intention of the Chicago Great Western to accept second-class tickets in first-class Pullman sleepers. The Great Western says it is forced to take this action on account of the tourist-sleeping-car competition of the other roads. The move will apply only to through passengers, as there are no second-class rates in effect to way stations.

Eastbound freight rates continue to be well maintained. An unusual amount of traffic is going to Norfolk via the Erie and the Norfolk & Western. It is said that the latter is shading the rates, but the Erie claims innocence of any participation. The total shipments of freight, not including live stock, by all lines for the week ending April 4, amounted to 82,694 tons, against 88,032 tons during the preceding week, a decrease of 5,338 tons, and against 60,614 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	WEEK TO APRIL 4.		WEEK TO MARCH 28.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central....	7,336	8.9	8,742	9.9
Wabash....	6,276	7.6	7,025	8.0
Lake Shore & Mich. South.	9,771	11.8	11,216	12.7
Pitts., Ft. Wayne & Chicago	8,617	10.4	7,053	8.0
Pitts., Cin., Chi. & St. Louis.	7,518	9.1	8,057	9.1
Baltimore & Ohio....	6,470	7.8	7,296	8.3
Chicago & Grand Trunk....	8,712	10.5	12,907	14.7
New York, Chic. & St. Louis	6,711	8.1	6,782	7.7
Erie....	17,428	21.1	15,329	17.4
C., C., C. & St. Louis....	3,855	4.7	3,655	4.2
Totals....	82,694	100.0	88,032	100.0

Of the above shipments 6,141 tons were flour and mill stuff, 47,196 tons grain, 10,474 tons provisions, 7,419 tons dressed beef, 1,792 tons butter, 1,363 tons hides and 4,256 tons lumber.